COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

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Evidence Must Be Unimpeachable

COLLECTION of information along two lines has been definitely inaugurated by the U. S. Coal Commission. Schedules are being sent to the coal companies asking for costs of production and realization from sales by months for the year 1921 and for earnings of men employed in the same year. Thus the two questions with regard to which there is perhaps the most controversy will be covered by comprehensive figures—the earnings of the producers and the earnings of the mine workers.

The schedules that have been adopted are rather formidable. On the cost report form there is provision for a maximum of 146 numbered items calling for 137 separate replies. Producers having less than 120,000 tons annual output are permitted to subtract 40 items from the list, leaving 97 items to answer. The longer schedule calls for a division of labor costs between 15 items, supply costs between 16 items and miscellaneous income spread over 9 items not required on the shorter form.

One may well wonder at the interest of the commission in a division of costs so fine as to set out, for instance, labor cost for "haulage and hoisting" from "dumping and tallying," while neglecting to provide for a subtotal on labor costs that would permit comparison of payroll costs from the cost form with those from the same mine in the same month on the earnings form. Just why a commission inquiring into the vexed coal question displays such interest in the allocation of supplies expense among 16 classifications, including everything from mining through drainage, ventilation and railroad-car loading to engineering is not clear. Perhaps the inspiration was afforded by a diagram prepared and circulated by the operators some time ago showing to the number of several hundred the variety of items that go to make up the cost of producing a ton of coal.

The cost statement has 110 numbered lines, of which but 29 call for figures taken from the books; 15 are totals and subtotals, 15 are blanks, 40 are the details noted above called for on the long but not on the short form, and 11 are "yes or no" questions. For the majority of producers there are but 10 questions in the remaining 35 numbered lines of the schedule that require figures taken from the books. Any producer who keeps books can easily answer the questions on the short form, and the 40 additional details of the long form are of little moment.

The schedule covering earnings of mine labor is cumbersome but complete. It provides for a year's record by pay periods of the earnings and days or hours worked by each employee by name, classified by occupation. There is but one way to ascertain what a man earns in a year and that is to trace his record throughout the year. Since dollars received on a given wage scale is a function largely of time worked—even as regards tonnage men—low earnings connote few days of work, high earnings advantage taken of the better opportunity for labor. The labor schedule makes provision for bringing out, so far as mine records will permit, the relation of the days the individuals work to the days the mines offer opportunity to work. Absolute data in this respect for tonnage workers cannot be had because, as everyone knows, it has never been possible to ascertain how many days or how many hours per day the tonnage man stays on the job. The miner prizes so highly his freedom of action, his liberty to come and go, to absent himself at will, that any attempt to check his time other than by the roughest methods is doomed to failure.

These two studies—the costs and profits of the operators and the earnings of mine labor—are the most important statistical investigation that the commission will have to undertake. They are costly both for the operators, who alone can supply the data, and for the commission, which must compile the returns. The answers from these schedules will give the American people information on those points regarding which there is and has been the greatest controversy. Facts about what the mine workers earn and the companies profit from the production of coal have hitherto been either too fragmentary to carry conviction or have been ex-parte statements, subject to partisan attack and so attacked. The Coal Commission is looked upon as the agency of the American people set up to get all the facts and certify them to the public. This question must be settled.

It is but natural that operators' associations having collected much of these data regarding costs of production and earnings of labor—data in their estimation correct and true—should desire the commission to accept their compiled returns. This, it appears, the commission will not do, for the reason that it must build its results on original sworn returns, holding that to do otherwise would lay its work open to such criticism as would annul its value and weaken its effectiveness.

To this there is no conclusive answer. Having set its face to the task of supporting the Coal Commission in its labors of getting all the facts about their industry, the coal producers must go along with the commission with this policy. Whatever would discredit the results of the commission would discredit the operators. The results must not only be the facts, they must as well be undeniably the facts. Quibbling over methods that are designed to produce unimpeachable evidence is shortsighted. Figures that the most carping critic in Congress or the cleverest publicity man for the United Mine Workers cannot assail will be worth several times what it will cost the operators to fill out all the blanks the commission may design. The coal producers should give no occasion to add to their reputation for refusing to give up the facts about the coal industry.

"Peace! Peace!" And There Was No Peace

"GENTLEMEN, let bygones be bygones," declared John L. Lewis, president of the United Mine Workers, in that famous "peace" conference he called in Cleveland in early October. Then he spoke sonorously of the need for both sides to compose their differences, make mutual concessions and for each to devote itself to the problems confronting the coal industry with due regard for the interests of the other. Beautiful indeed were Mr. Lewis' sentiments. "Now if he only means what he says," said operators leaving that meeting, "there's hope of setting up relations with the union on a businesslike basis after all." They thought it too good to be true, but a few with least experience in dealing with Mr. Lewis' organization went home encouraged. The others merely went home.

And now that the Chicago sessions of the joint committee on methods for wage making have come to their hopeless conclusion, where is Mr. Lewis' sweet program for peace? The miners refuse to consider for a moment any method of future negotiations that would include less than the four states of the Central Competitive Field. They refuse anything and everything even faintly smacking of arbitration, partisan or nonpartisan. They announce truculently that they have already decided what the next scale of wages shall be. Yet they talk of "negotiation."

Ponder the fact that there have been no "negotiations" between the operators and United Mine Workers since the conference of 1916. Mr. Lewis, in power since 1919, has not negotiated a single scale. He has forced demands on the industry by strikes. Lewis has set himself to militancy and he shows no inclination to turn back. The leader of a pack, he must keep in front or be torn apart by his followers. Credited with being at heart a conservative, he has surrounded himself with the tradition of a fighter that pursues him relentlessly.

Ponder further the conditions that will face Mr. Lewis when he determines his policy for next April. Following five months' strike idleness, will have been seven months' work averaging less than half time, with what in prospect after April 1? Large groups of mine workers will work no more than two days per week this winter, due to short car supply. Other groups will make four, five and even six days per week. In total they will get all the work for which there is demand for their product, but inequality in car supply is now making and will continue to make for better opportunity here than there.

Without stopping to argue that an industry that is so overmanned is one to leave, these short-time men will call for shorter time and greater wages. Is it not pretty clear that as against trying to take the men through a year of little work, letting the dissatisfied growl and get out, Lewis will have the choice of holding them in line through a strike? The morale of his men is more easily maintained on strike than working a day or so a week, no matter what the wage. And then he has the reputation of winning strikes. Does any of this "augur well for the future relations" between operators and miners? Mr. Lewis said the October conference developments did.

On the other side the question now is: Can the operators afford to avoid a strike next April at the expense of continuing a wage scale that will inevitably result in shutting down mines for lack of a market willing to pay the cost of coal? Is a strike any worse than that? It cannot honestly be said that a majority of operators want to precipitate a strike. Turmoil has damaged the industry enough already. It can honestly be said that most thinking operators earnestly desire friendly relations with labor and some radical change in the industry to permit it to operate on business principles. It can further be said that most of them earnestly seek some way to put their industry right with the people. But unless some new element is introduced between now and April 1 there is grave doubt as to the propriety of any course that now seems open. The situation is, indeed, one to give concern to the coal operators of America and the public.

Abusing the Check-Off in Indiana

IF PROOF were ever necessary—or valuable—to show that the United Mine Workers are ever ready to violate the terms of their contract agreements with operators the present check-off case in Indiana is a fair citation. There the union has not hesitated to abuse the sacred check-off, which is already under suspicion by the courts, and to bring to the fore, where all may see, evidence that the check-off is a spigot which can be tapped with more or less ease whenever the organization needs money. If the present intent is to amass a greater strike fund against the developments of next April, why should not the operator of that state fight back vigorously?

The battle is over the question: "What are union dues?" Under the agreement the operator "shall offer no objections to the check-off for the checkweighman and for dues to the U.M.W. of A." Ever since the signing of the contract 50c. a month has been checked off for the national union organization. Now the union is demanding $2 a month for November and December for the national. This, the operators contend, is a special assessment and not regular dues and therefore is not collectable. They hold a letter from John Hessler, president of the Indiana union district, calling it a special assessment—a letter written before the present dispute came to a head.

Whatever the justice of the debate over the meaning of the word "dues," the damning point in the case against the union is that during the past month, when the special assessment of $2 was supposed to have been collected, check-off increases of various amounts made by secretary-treasurers of the locals did not specify $2 for the national at all. Neither were these increases uniform. The explanations given by the locals varied widely. In one instance a secretary-treasurer explained that the union dues had to be increased because he was a new man on the job and had underestimated his expenses. In other cases there were astonishing increases in burial and sick-fund items, and all sorts of surprising boosts in initiation fees appeared. In one local this increase was from $10 to $50, in another to $100. The fact that several operators paid these increased check-offs in November through misunderstanding and through their not being alive to what was going on is no cause for the balance of them paying it now.

It will be recalled that in 1921 the Pittsburgh operators refused to collect a special assessment for the union under the check-off, an assessment the purpose of which was to support the Mingo war. Because the operators had certain knowledge of the use for which this money was designed, the union did not press the claim, and the "dues" were not collected.

Choosing, Lubricating and Attaching Wire Ropes*

Hardness and Tensile Strength Found in the Same Rope but Flexible Rope Is More Subject to Wear—Lang-Lay Rope Stronger Than Regular Lay

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SELECTING the proper type of wire rope for each kind of coal-mining service is an important duty for the engineer. A study of the various materials used in wire rope is of interest because a knowledge of the physical characteristics of the wire composing the rope will give a fairly good idea of the way in which a rope will behave when it goes into service. Four kinds of wire ordinarily are used in wire-rope manufacture:

Crucible-steel hoisting rope, composed ordinarily of materials of a tensile strength ranging from 160,000 to 200,000 lb. per square inch.

Extra strong crucible-steel rope, composed of materials of a tensile strength ranging from 200,000 to 220,000 lb. per square inch.

Plow-steel rope, composed of materials of a tensile strength ranging from 220,000 to 240,000 lb. per square inch.

Special improved plow-steel rope, for which each manufacturer has his own trade name, composed of materials of a tensile strength ranging from 240,000 to 280,000 lb. per square inch.

Tensile strength is not the only characteristic of the wires; others must be borne in mind. Mention was made in the first part of this paper of the importance of hardness and of the relative value of these steels when they are compared with this physical property in view.

In addition to the test for hardness, wire for rope must stand certain ductility tests. Even the hardest wire must meet a high ductility test, else it is unsuited for that purpose. There are cases where hardness is required in wire to withstand abrasion or rubbing, and in those cases either plow steel or monitor grade usually is required. From the standpoint of tensile strength alone, it may not be necessary to use this material; but in order to get maximum service, it frequently is necessary to use rope of the greater strength in order to get the harder steel and the life that goes with it.

In every rope installation two factors must be considered, the cost of installing the rope, including the time lost in so doing, and its original cost. It frequently happens that the cost of installation is a large percentage of the original cost of the rope; anything that can be done, therefore, to increase the life of a rope would cut down not only the original cost but part of the cost of installation.

It always is advisable to use a rope of standard construction unless the service it renders is unsatisfactory, and then only such special constructions should be considered as offer promise of reasonable improvement in service. If, for instance, a plow-steel 6 x 19 hoisting rope wears out too fast, a monitor or improved plow-steel rope would afford a harder wire and probably the added rope service desired. If not, then an effort should be made to reduce the friction. The ropemaker should not be called upon to produce greater efficiency unless the mining engineer has done his part. In case of a bad overlay on the drum, however, a mining engineer can do little to better conditions unless a larger drum can be provided. In that event it is the ropemaker's problem to propose a special construction or quality that will meet the stresses that the overlaying of the rope introduces. In some such cases a flattened-strand rope, 6 x 25 construction, has given excellent results, and in other cases a Seale patent, 6 x 19, or modified construction such as 6 x 16 has produced the results desired. Lang-lay ropes often are better than regular lay for shaft ropes where overlaying is unavoidable.

LANG-LAY ROPE USED FOR MANY YEARS ABROAD

Many opinions have been expressed as to the respective merits of regular-lay and Lang-lay rope. The standard rope used in the United States has always been one of the regular lay. Without delving too deeply into the reasons for this, I might say that this probably is due largely to the fact that the regular-lay rope is more easily produced and in general is more satisfactory to the user than the Lang-lay rope. The latter rope is not, however, a new style of rope construction. It is as old as the art itself, having been brought out almost simultaneously in both England and Germany—in England by Lang and in Germany by Albert.

A Lang-lay rope is one in which the wires in the strand and the strands in the rope are twisted in the same direction. Lang-lay is never used in hemp cordage, because a hemp rope would not hold together if made in this manner. Perhaps this is one of the reasons why the ropemakers have fallen into the habit of making regular-lay rope instead of Lang-lay.

In the regular-lay rope the wires in the strand and the

*Second instalment of an article from a paper entitled "A Discussion of Wire Rope as Applied to Mining Operations," read at the fall meeting of the Rocky Mountain Coal Mining Institute. The first part of the article, "Wire Rope Is Tough but Faulty Installation and Careless Operation Quickly Destroy It," appeared in *Coal Age*, pp. 825-828, of the present volume.

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NOTE.—The headpiece shows the rope-haulage road of the Lion Coal Co., Wattis, Utah, as seen from the tipple. The rope is about 10,000 ft. long.

strands in the rope are twisted in opposing directions. The result of this method of manufacture is a tendency in the rope of regular lay to hold itself together and particularly to resist any force tending to untwist it. The action which would take place in a regular-lay rope, when subjected to a force tending to untwist it, would be to cause wires in the strands to twist up tighter, thus creating a powerful reaction against too much untwisting.

In the Lang-lay rope, however, under the same conditions, an untwisting of the rope proper will cause an untwisting of the strands and loosening up of the wires, the only force tending to prevent the rope from completely untwisting being the natural stiffness of each wire taken by itself. Compare this with the tendency of a regular-lay rope which is to react as a whole and powerfully to stop the untwisting.

ROPE BRINGING CARS TO TIPPLE
Another view of Lion Coal Co.'s rope haulage road with mine in rear.

Installations which have used Lang-lay ropes and reported unfavorably on them have done so in many cases owing to the natural reaction against innovation that takes place when the Lang-lay rope is put in service. It should be noted that whereas in the United States probably 90 per cent of the ropes used are of regular lay, in England, Continental Europe and South Africa by far the greater percentage of the mining ropes are of Lang-lay construction. Had the difficulties in the use of Lang-lay ropes been insurmountable their use would not have been so general in those countries.

In a Lang-lay rope the worn spot on each wire is longer than it is in a rope of regular lay. The Lang-lay rope usually is at least 5 per cent stronger than a regular-lay rope composed of wire of the same size and strength. This is an advantage that has sometimes been overlooked by those who have criticized the former. Another criticism that has been offered is that it is more difficult to splice. This, I think, is a fact that is granted by the manufacturers and users. It is not, however, an insurmountable difficulty, as has been proved by the use in various places of what is known as flattened-strand hoisting and haulage rope. All of this rope is of the Lang-lay type, and not only can be, but has been, spliced successfully, and found to give admirable service.

The particular place where it is advisable to use Lang-lay rope is on gravity inclines and slopes where the rope rubs or drags. It may also be used on vertical shafts, although few such installations are found in the United States. In Canada most of the shaft ropes in use are of Lang-lay construction, due largely probably to the influence of Great Britain in furnishing ropes of this section. Lang-lay ropes on shafts have, so far as observation goes, given good results and little trouble. In general, a Lang-lay rope should not be used with swivel connections, as it tends to untwist.

Ropes composed of round strands differ mainly in their flexibility. Listed in the order of their increase in that quality are the following constructions:

TABLE I—ROPE ARRANGED ACCORDING TO FLEXIBILITY

6 strands, 7 wires, 1 hemp core—round-strand rope 6 strands, 8 wires, 1 hemp core—flattened-strand rope	least flexible
6 strands, 19 wires, 1 hemp core—round-strand hoisting rope 6 strands, 25 wires, 1 hemp core—flattened-strand hoisting rope 18 strands, 7 wires, 1 hemp core—non-spinning hoisting rope	flexible
8 strands, 19 wires, 1 hemp core—extra-flexible hoisting rope 6 strands, 37 wires, 1 hemp core—special flexible hoisting rope	very flexible

Flexibility is increased by increasing the number of wires in the strand and decreasing the diameter of the individual wires. Whenever, therefore, the flexibility is decreased, the wearing surface also is decreased and the wires will not stand as much abrasion as those where a coarser construction has been adopted. Were it not for this fact, any place requiring a flexible rope could have its requirements fully met regardless of the other conditions.

Rope consisting of 6 strands of 7 wires, of course, is rather stiff and is used only for mine haulage and similar uses. The same is true of flattened-strand rope, 6 strands of 8 wires. The rope of 6 strands, 19 wires, as modified is used for both mine hoists and haulages, as is also the 6 strands, 25 wires, flattened-strand hoisting rope. In the case of haulages, rope something like the Seale patent construction of 19 wires is used, and in the case of shafts the regular 19-wire strand rope is used.

Use Many-Strand Rope If Guides Are Lacking

Rope of 18 strands, 7 wires each, known as non-spinning rope, is used in mining operations almost wholly for shaft sinking, for when it is used a shaft can be sunk without guides, the bucket showing no tendency to rotate when being hoisted. This rope, of course, is specially constructed for the purpose of attaining this freedom from rotation. It is not a rope that is recommended for promiscuous hoisting purposes, but it is exceedingly efficient in shaft sinking and has demonstrated that it is superior to any other type or construction for that purpose. Ropes composed of 6 strands of 37 wires are seldom used for shaft work, because the flexibility is in most cases greater than is required. Rope of 8 strands, 19 wires is seldom used for shaft work, and for the same reason. Shaft ropes, which are overlaid in winding on the drum, are made of modified constructions containing coarser wires.

During the process of making the manufacturer should lubricate the rope internally and externally. It can be done better and more thoroughly then than at any other time. Additional lubricant should be applied as soon as the rope shows external signs that such attention is needed either to reduce friction or to prevent rust. In making the application it is preferable to put on a small quantity frequently than a larger quantity at longer intervals. Be sure the rope is free from water, for if it is present it will prevent the lubricant from adhering.

Most lubricants are free from acid, but if in doubt, a test for acidity should be made. Acid will cause the steel wire to become brittle. Whenever possible, a can of lubricant should be placed so that it will drop from a spout on the rope as it runs back and forth. This will be found to lubricate the rope effectively and at a low cost. With the drip method, a thinner lubricant may be used than where the lubrication is more complete but is done only periodically. Many lubricants must be heated before application, and in the winter it is

more difficult, of course, to lubricate a rope than in the summer.

A wire rope wears out gradually in service until the time comes when replacement is deemed necessary. When ropes are used for hoisting men, it is usual to remove ropes earlier than when ore or rock alone is hoisted. The evidences which are allowed to govern in the decision as to the time when a rope should be rejected are as follows:

(1) External wear on the wires.
(2) Breakage of individual wires.
(3) Corrosion due to mine water or electrolysis.
(4) Torsion or breakage of wires near attachments.

External wear alone seldom is sufficient of itself to necessitate the removal of a rope, but broken wires are always looked upon as more or less of a source of danger. Corrosion, if internal, is not as noticeable as the other two, but it is really more dangerous than either, being concealed in many cases. Torsion or breakage of wires near attachments is caused by a crowding ahead of the twist or lay of a rope as the hoists are made, coupled with the vibration of the rope which comes to a stop at or near to the drum. This makes it advisable to cut off a short piece of rope from the cage end at regular intervals of time, thus changing the point where the vibration of the rope localizes.

In this connection reference should be made to Bulletin No. 75 of the U. S. Bureau of Mines, where further particulars are given as to practice in the recapping of the ropes on mine hoists. A similar practice is in use in the mining field of the Transvaal.

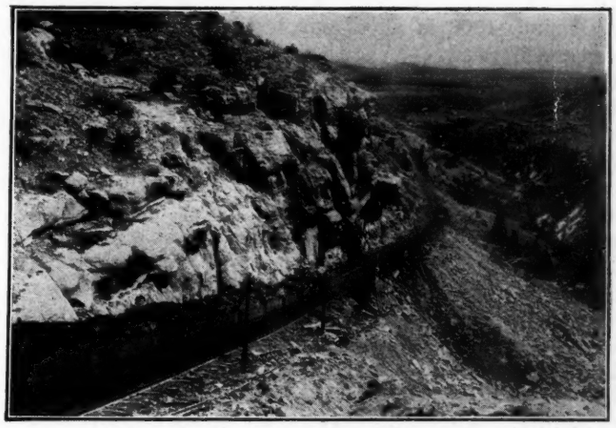
What Deterioration in Rope Is Fatal

In passing judgment as to whether a rope should be replaced care should be taken to see that all evidences of weakness are given due consideration. A rope showing only wear will be but little reduced in its ultimate strength, much less than the wear would appear to indicate, for the worn spots on the wire reduce the cross-section of the rope but little, and after all it is the cross-sectional area at any given point which determines the strength.

The location and distribution of the broken wires in a worn rope also should be given consideration. Single wires broken in any strand, if separated by a distance of, say, 3 ft. will reduce the strength by only 1/114 if the hoisting rope is composed of 6 strands of 19 wires each. Several wires broken in one spot, however, will reduce the rope strength materially.

In determining the life of a hoisting rope different methods are used to keep a record of the service obtained. Sometimes this is measured by the time the rope is in service, but if the rope is not worked steadily for the entire period, this can at best be only a partial criterion of rope performance. More often a record is kept of the tons hoisted to the surface, including the rock and ore. If this value is sufficiently high, the rope service is considered satisfactory. A rough check of this can be obtained by taking the number of trips made during the rope life.

For elevator work it is becoming more and more common to measure the service by the number of miles traveled by any set of ropes, and it is practicable to do the same with the hoist of a mine shaft by attaching a counter to the drum shaft with suitable reduction gears by which the mileage can be mechanically determined. Whatever method is used for keeping track of rope performance, allowance will always have to be made for contingencies or variations in service.



WHERE ROAD UNDERMINES THE ROCK FACE

To reduce rubbing of rope on rails and roadbed, the road is made as straight as can be arranged. A rocky mass that seems to have turned the valley makes it impossible to keep the road on a straight line.

There is still much of what might be termed "conservatism" when it comes to a discussion of the best means of fastening a cage to the end of a wire rope. Men still tend to cling to the older forms of attachment instead of adopting improved methods. I am convinced that this is because many rope users have perhaps never seen ropes tested and feel that in making a change to some other method than that which has been in use for a period of years involves a responsibility which they do not desire to assume.

Most of the general types of rope fastenings have been in use for many years. They are described in Table II, where their efficiencies are given as compared with that of a steel socket with a properly placed zinc filling, rated as 100 per cent.

TABLE II—ROPE FASTENINGS AND THEIR RELATIVE EFFICIENCIES

	Per Cent
1—Wire-rope clamps and thimble	75–80
2—Wire-rope clips and thimble	80–85
3—Thimble or eye splice	90
4—Open or closed steel sockets	100

For clips, the following table should be used in making attachments to the ends of a rope.

TABLE III—NUMBER AND SIZE OF CLIPS FOR ROPES OF VARIOUS SIZES

Dia. of Rope In.	No. of Clips Recommended	Size of U-bolt In.	Max. Size of Wrench for Tightening, In.	Min. Spacing Between Clips In.
¼	2	⅜	8	4
5/16	2	⅜	8	4
⅜	2	⅜	8	4
7/16	2	⅜	8	4
½	2	½	12	5
9/16	3	½	12	5
⅝	3	½	12	5
¾	4	⅝	16	6
1	4	⅝	16	6
1¼	5	⅝	16	6
1½	5	¾	16	8
1¾	6	¾	16	8
1½	6	¾	16	8
1⅝	6	⅞	16	10
1¾	6	1	20	10
1⅞	6	1	20	10
2	6	1	20	10
2¼	6	1¼	24	12
2½	6	1¼	24	12
2¾	6	1¼	24	12
3	6	1¼	24	12

With either clamps or clips it is necessary after the load is placed on a rope to go over all the bolts and tighten the nuts, because tension on a rope compresses the hemp center and releases the stress on the bolts, making them unsafe. One reason for using several clamps or clips is to keep down to a reasonable value the pressure necessary to make them hold.

No fastening except the socket filled with zinc will develop maximum efficiency. This method has been

used since 1908 in all of our tests and with uniformly successful results. Thousands of sockets all over the United States have been so attached without a single failure. This form of fastening has been recommended by the U. S. Bureau of Mines and by the wire-rope manufacturers. It is simple, strong and compact. It can be made quickly and easily with the facilities available at any mine. The strongest fastening is none too good where safety of human beings is at stake.

In attaching rope to a drum it is customary to use a hole through the drum and to carry the rope around a spoke or the central shaft and fasten the end back with wire-rope clips. Several laps of rope should be left on the drum when the rope is out at its point of maximum travel, to prevent undue pull on the drum fastening. While this method of attachment is somewhat crude, its use is almost general and little if any trouble comes from it.

In installing a rope it always is advisable to run the rope out its full length, whether it is to work in a shaft or a slope, and let any tendency to untwist run out before it is attached to car or cage. Then several trips should be made, and the rope again disconnected. If this is done the tendency to kink which is sometimes found in new ropes will be avoided. It is essential to do this on both vertical shafts and slopes as it will insure better operation and prevent the occurrence of trouble later.

The Frugal Man Saves Oil Without Injuring His Machinery

By F. C. Sinback
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Lack of proper lubrication doubtless is the cause of most of the trouble experienced in the operation of coal-mine machinery. By this I do not mean that enough oil and grease are not applied. On the contrary, I find in a large number of cases that twice or three times as much oil is being used as would lubricate the machinery properly, yet the machines are constantly suffering from a lack of lubrication.

This, for several reasons. First, the oil or grease does not reach the bearing or part to be lubricated, the oil holes and channels being full of coal dust or dirt; second, the oil or grease is not applied at the proper time; third, the lubricant employed is not of a quality suitable for the particular type of machine or bearing on which it is used.

For the lubrication of tipple and washing machinery common black oil is good enough. The oiler, however, should be instructed in its use if any economy is to be shown. He should be provided with wires of several gages so that he can clean out the oil holes, and before applying any oil he should see that all such holes are clean right down to the shaft bearing. He should then use only enough oil at any one time to lubricate the bearing, as any surplus that runs off lubricates nothing and only makes a mess.

The first oiling in the morning should be done before starting up, and the oil should be applied hot so that it will flow freely into the bearing and furnish lubrication the moment a start is made. I have known of several instances where those in charge did not insist that bearings be oiled before starting but instead preferred to wait an hour or more. A bearing will be harmed more in a few minutes of dry running than in a month of steady operation with proper lubrication. For this reason it is always advisable to oil up any kind of machinery before starting in the morning, as some of the bearings may be dry and it does not pay to take a chance.

If grease is to be used on this class of machinery every bearing should be equipped with an approved grease cup of some kind. Furthermore a grease should be selected that will not harden. If spring cups are used they must be watched closely so as to be sure that they are feeding and the oiler should screw each cup down a little, twice or more each day, the first time being before starting up in the morning. All oil and grease should be stored in covered containers from which coal dust, dirt and grit should be carefully excluded.

I find that the slow-running bearings around washery and tipple are neglected more than any others. As they do not run fast enough to produce sufficient heat to be noticeable, they are allowed to become dry and grind themselves out. Oil, it is true, may be slopped all over them but the oil holes are likely to be plugged tight with coal dust and dirt. The oiler of such equipment should be required to keep all deposits of oil, grease and coal dust removed from the bearings, as these are not only unsightly but tend also to conceal the real condition of the machinery.

If motors are used to drive tipple or washery machinery, their bearings should be drained and washed with kerosene or gasoline at least once a month. Only a high-grade oil should be used, and the oil rings should be examined daily to see that they are operating properly. On cold mornings these motor bearings should be watched closely, as the oil is likely to thicken to such an extent that the rings will not operate. In that case the bearings may be damaged before the oil thaws enough to allow the rings to function properly.

All oil drained from motor bearings should be saved and filtered, as it can be used for lubricating other machinery which requires an oil of a comparatively high grade. I use this oil in the power-house oiling system.

A high-grade medium-soft grease, absolutely free from acid, should be selected as a lubricant for ball bearings on locomotives and mining machines. If any acid be present it will pit the highly polished surfaces of the balls and races, and materially shorten their life. Great care should be exercised in keeping grit and dirt out of the grease used in such bearings, as they are ruined quickly by a small quantity of such abrasive material.

On all high-speed bearings of coal-cutting machines I would suggest using a good grade of red engine oil. On the other bearings I would use black oil, except on some of the worm gears, where grease should be employed. The same precautions as to keeping oil holes open and as to the quantity of lubricant used that have been advised in connection with tipple and washery machinery also should be observed on the mining machine. Also the machine always should be oiled before a start is made in the morning.

Before starting to cut any working place the cutter chain should be thoroughly lubricated with black oil. This best can be done by running the chain slowly and pouring the oil onto it at a point where the oil will be carried under the guides. By paying more attention to lubrication the life of machinery will be appreciably lengthened, costly delays will be lessened and a great saving in oil will be shown. A small quantity of oil properly administered will do far more good than a large quantity wastefully used.

Cutting Thin and Pitching Coal Beds in Belgium By Longwall, Using American Chain Machines

Output per Man at Face Has Been Doubled by Change in Methods—No Regular Packwalls Constructed—Stepping of Working Faces Reduced to Five Yards—Foreign Labor on Increase

By F. C. Cornet*
New York City

NOBODY believes that American coal-cutting machines, in their present state of development, can ever be put into successful use in all the Belgian mines, for in some of them the difficulties to be met are extremely unfavorable. Where the pitch of the coal has not exceeded 35 deg., however, the American chain cutter of the so-called longwall type during the last two years has shown such a creditable performance that it is now safe to predict that it will soon be considered an instrument without which the coal in most of the mines of that country cannot be worked at a profit.

In order to understand clearly how the Belgians had to modify their plans so as to make it practicable for them to use mining machines to advantage in their mines it is necessary to describe briefly the mining methods which usually have been adopted in the past in that country, where, according to duly recorded data, coal has been mined for a longer period than in any other country. One of these mining methods, shown in Figs. 1 and 2, consists in driving to the rise, on the full pitch, a series of short faces, *5*, arranged in groups of four to seven—four in the case illustrated.

Each group generally has an aggregate face development of 250 ft. or thereabouts and is driven some distance in advance of the following group. Each face in a given group also is in advance of the following one, but a few feet only. Fig. 1 shows a plan of workings of this kind arranged between two places, *3* and *4*, both driven level in the seam at different elevations and at a relatively considerable horizontal distance from each other. This distance, *L* in the case represented, is 1,100 ft., whereas *H*, the difference in elevation, is 420 ft., making the grade about 38 or 39 per cent.

Place *3* serves as the main road through which all the coal mined between *3* and *4* is hauled away. Place *4* itself was used at an earlier period as a haulage road through which all the coal mined to the rise of that place up to another place of same character driven in the seam at a higher elevation was hauled away. Place *3* is tributary to tunnel *1*, driven across the measures and serving as both air intake and general haulage road.

In the same way, place *4* is tributary to tunnel *2*, also driven across the measures, serving as general return airway and leading to the fan shaft all the air coming from the level of place *3*, not only through the workings

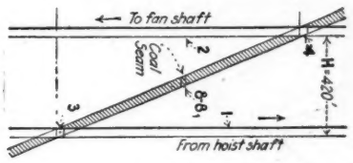


FIG. 2—ELEVATION, CROSS TUNNELS AND COAL SEAM

Seam rises about 420 ft. in 1,000, or 42 per cent. The section is taken along Section 0—0 of Fig. 1. The long tunnels through solid rock shown here are one of the causes of the high costs of Belgian coal. The cross-section of the tunnels in the coal seam are marked *3* and *4*.

represented but also through all the other workings in operation between the level of tunnel *3* and that of tunnel *4*. There may be a dozen or more such workings.

All places marked *6* are so many self-acting inclined planes through which mine cars are taken from the haulage road *3* to the different faces (*5*) and vice versa. All these planes are maintained in the gob. Half way between places *3* and *4*, a level place (*8*) is provided in the gob, crossing all the planes of the same group of faces.

Below place *8* only one plane is thereafter maintained, while all the planes above *8* are kept working until all the coal that is tributary to the group of faces has been worked out. Parts of planes when no longer used are allowed to cave. When a group of faces is worked out, all places connected with it also are allowed to cave, as shown by dash lines and indicated by *7* and *8*. All planes, intermediate places (*8*) and the main road (*3*) are double tracked, the gage varying between 22 and 24 in., according to the preference of the company operating the mine. Some cars have a capacity of only 0.33 ton, but some will hold as much as 0.60 ton. This also varies from company to company.

Mining machines tried on the short faces shown in Fig. 1 gave results that were unsatisfactory economically, on account not only of the shortness of each individual cut, which made it necessary continually to move the machines from place to place, but also and principally on account of the difficulty encountered in moving the machines through the narrow and slate-encumbered passageways provided for the passage of air from face to face and group to group all the way from the lower level

*Consulting engineer.

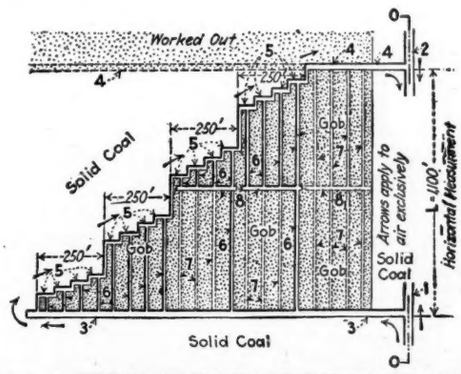


FIG. 1—METHOD OF HAND MINING IN BELGIUM

This plan shows a method that met all requirements more satisfactorily than any other method so long as machines were not used. It is easy to see how the broken face was better suited to hand mining than to machine cutting. The long passageway by which the machines had to be taken from one group of faces to the next was not always as readily negotiable as might be desired and as for moving the machine by way of the self-acting planes that was out of the question.

to the upper one. To move the machines by way of the planes proved well nigh impossible.

Recognizing the impracticability of using cutting machines to any advantage in such workings as shown in Fig. 1, the Belgians turned to the method shown in Figs. 3 and 4. This method, to be sure, was not unknown to them. They had practised it to some extent, and with some degree of success, for many years. But for some reasons, all of which were not fancied, the method never proved nearly as successful as that described above.

These reasons, fancied and real, are of a purely local order. To explain them to readers not accustomed to Belgian mining conditions and customs would be too arduous and long to be undertaken here. Be that as it

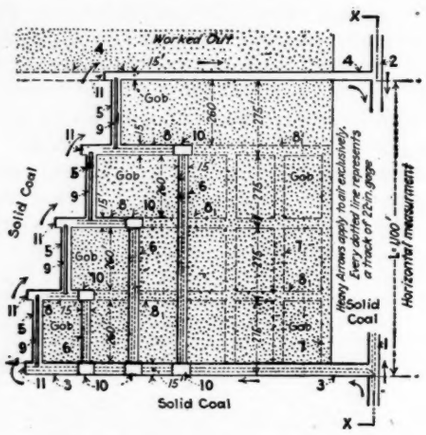


FIG. 3—PLAN AS MODIFIED TO FIT MACHINES

After they adopted machines for cutting the coal Belgian engineers fell back on a plan of mining that they had formerly rejected. The coal slides down the slope in a chute and reaches the car in the roadways *(8)*, which car is transferred to a self-acting incline at the plate marked *(10)*. Note that, regardless of their condition, the bits are changed in the machine when it gets half across the face. This saves power.

may, as soon as the until-then less-favored method was found to be the more adaptable to mining machines, all the drawbacks that had been charged against it were overlooked in an effort to get results with the cutters.

Referring to Figs. 3 and 4, the workings shown are in a seam of the same pitch and general character as are the workings shown in Figs. 1 and 2. The main haulageways, air returns and rock tunnels also are similar. There are here only four faces, all marked *5*, each 260 ft. long in horizontal measurement. They lie directly up the pitch and are advanced in the direction of the strike of the seam. Each face is kept ahead of the one immediately above it. Access to the foot of the lowermost face is directly through the haulage road *(3)*. Access to the foot of each of the other faces is through a self-acting inclined plane and a corresponding level place (*6* and *8* respectively), both maintained in the gob and both double-tracked.

Regular point-and-frog switches are not used in this track work. Steel floors *(10)* are laid at all turns, upon which the cars are turned by hand and made to take the track desired. These floors soon become so polished and slick that it takes but little effort to maneuver the cars rapidly as wanted. All these floors require is scraping every morning to remove the material that has hardened upon them during the night.

After scraping they are sprayed with a little black oil, which adds to their slipperiness and gloss. They shine even under the light of the safety lamps, and for that reason are called "polis," which in French means a polished, shining area.

As mining progresses, that is, as the faces advance, the plane serving the uppermost face is in time discontinued and allowed to cave. The next plane is extended upward through the gob to level *8*, serving the uppermost face. In the same way and simultaneously the service of the face second from the top is insured by extending upward through the gob the plane that was serving the face second from the bottom.

The service of the latter is itself insured through a new plane rising from the haulage road *(3)*. Belgian miners think no more of driving a place through the gob than our miners of driving a crosscut between rooms. Caved planes and level places, shown in dash lines, are indicated by *7* and *8*, respectively.

As sufficient headroom can never be provided even for mine cars by merely removing the coal the necessary height is obtained by digging into the floor. This is called in French "couper la voie," which means "to cut the roadway." Thus, the cars can be brought to the foot of the different faces at such a level relatively to the floor of the coal seam that the coal, sliding in chutes from along the face, is discharged either directly into the cars, or into small, gate-controlled bins, which in turn are emptied into the cars. When the pitch of the seam is not sufficient to make the chutes operate by gravity, mechanical chutes are used. A system of such chutes was described in *Coal Age* of Sept. 28, 1922. Belgian coal men do not consider that mechanical chutes are necessary so long as the pitch of the seam is 22 deg. or over.

I desire now to call attention to the practice of driving the small recesses *(11)* a few feet (8 to 12) ahead of the faces. The reason for these recesses will appear below. It might be said that place *4* is not properly driving, as it is an old place. But it must be reopened anyway, it having caved since it was first dug and left with nothing but a packwall to maintain it on the upper side.

It will be understood without explanations that the method illustrated in Fig 3 lends itself well to the use of American cutting machines. At one of the Amercoeur mines near Charleroi, where the faces are longer than those shown in Fig. 3, being 88 m., or nearly 290 ft., horizontal measurement, a cut 54 in. deep is completed in 3 hours and 30 minutes, including what time is necessary to change all the bits when the half way point is reached. The Amercoeur pitch is 22 deg.

At the Maurage collieries, where the pitch varies from seam to seam, and even in the same seam, from 10 to

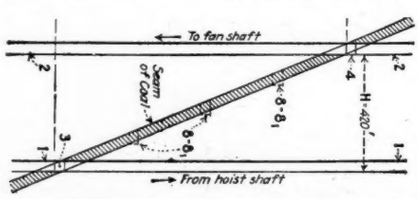


FIG. 4—ELEVATION OF TUNNELS AND COAL SEAM

The cross-section is taken through *X-X* of Fig. 3. It will be noted that the roadways 8-8_1 do not come out to the line *X-X*, a pillar being left to protect the tunnels from movement of the measures.

25 deg., the coal is cut at the same rate of speed as at Amercoeur, each 250 ft. face being cut 54 in. deep in exactly 3 hours, including the time consumed by a complete change of bits. In the case of the workings shown in Fig. 3 the time necessary for passing the machine from one face to the next varies with the distance separating the faces. It varies also with the condition of

the passageway, which before the arrival of the chain cutter was considered sufficiently large when it answered the purpose of ventilation and a man could pass through it without too much trouble.

Be that as it may, it took less time to pass the machine through this narrow roadway than it does in American room-and-pillar practice to move a cutter from one room to the next one. It must be said also that the adoption of the chain machines has had for immediate results not only to induce the Belgians to keep the passageways freer from obstructions but also to cause them to shorten the distance between faces. From the hundred feet that this distance sometimes was it has been reduced in some cases to 5 yd. The time lost in passing the machine from face to face is now less than 15 minutes.

The probability is that the tendency will be further to reduce the distance between the faces and to make the faces fewer in number. How many these will be will depend only on the maximum number of cars that can be handled at one loading station.

As to the recesses (*11*) mentioned above, they provide convenient places to start or finish a cut. They also are most handy for keeping the machine out of the way when not in use. In an article appearing in *Coal Age*, page 759, Nov. 9, 1922, I have referred to such recesses, calling them "flanking places."

Wherever chain cutters have been adopted in a Belgian colliery, the output per man has been increased at least 90 per cent. In some instances, as at Amercoeur, during January of the present year, which was the record month, the increase in individual output was an even 100 per cent. What is meant by individual output is the figure obtained by dividing the number of tons of machine-mined coal by the total number of men, from assistant mine boss to bit carrier, employed in mining the coal and delivering it on the haulage road, coupled in trips ready to be hauled away.

Coal mined by machines yields also 22 per cent more lump than hand-mined coal, lump being defined as material not passing through a hole 3 in. in diameter. This increase in individual output means much in Belgium, where men tended to become scarce even before the war and have become scarcer since. Polish and Italian miners are now hired in ever-increasing numbers by Belgian operators.

I recently met in Belgium a number of foreign men, women and grown children who had not had time yet to learn how to make themselves understood in French, but with whom I was able to converse pleasantly for the reason that they all spoke pretty good American, having been at some time in the near past employed in American mines, mostly in West Virginia and eastern Kentucky.

In these days when American opinion seems to vary so widely concerning prohibition and the effect it has on the foreign working man, it may be interesting to relate that all these Polish and Italian men and women, especially the women, look forward to the day when they will be lucky enough to land in this country again. When I jokingly mentioned prohibition they shrugged their shoulders and said "What do I care."

Relation of the Various Mine Power Costs Discussed at Illinois Institute

ONE of the leading articles at the Illinois Mining Institute was that of A. J. Hoskin, research assistant professor of mining engineering at the University of Illinois. Its subject was "The Distribution of Power Consumptions and Costs in Illinois Coal Mining."

In prefacing his paper, Mr. Hoskin said it was obvious that electricity is supplanting all other power underground but that on top "steam has better withstood the competition, although it is certainly yielding. Under some managements, if the airshaft is comparatively near the boiler house, an electric motor has little chance against even a second-hand steam engine for driving a fan. The same idea applies to small power units about the tipples. Though some managements may be strong for electrical units elsewhere, they insist upon the use of live steam for hoisting and ventilation and for driving screens and shop machinery."

In making the investigation into power consumption and costs in Illinois mines Mr. Hoskin assigned all consumption to six items: mining, haulage, hoisting, pumping, ventilation and miscellaneous. He said that as it is unusual for mining companies to subdivide into so many heads, he had much trouble in getting the necessary data. In fact, he said, he was told by many well-informed men that his effort would be fruitless. He made it nevertheless and asked fuller co-operation that his work may bear real fruit.

In his study of distribution he picked fifty shipping shaft mines of various sizes which he thought were typical of the 373 such mines in the state. Their combined daily production is 141,380 tons, varying from 650 to 5,200 tons each. Their depths vary from 101 ft. to 650 ft., the average being 321 ft. The thickness of coal ranges from 3 ft. 6 in. to 10 ft. with an average of 7 ft. 2 in. In 1921 they worked from 100 to 306 days and averaged 207 days.

Mining is manual in 9 mines, by compressed air in 1, and by electricity in the remaining 40 mines or in 80 per cent of the whole. Direct current is used in 38 and alternating current in 2. Haulage varies from "all-mule" to all electric. Hoisting is by steam in 95 per cent of the mines. Pumping is exclusively electric in 25 per cent of them, is performed by steam in 34 per cent and in the rest both electricity and steam are used. Pumping consumes 52 per cent of the total power used in one mine and less than 1 per cent in others, making the pumping average 5 per cent.

Many Fans Are Still Driven by Steam

Steam drives the fans at 38 of the 50 mines. The "miscellaneous" division of power consumption which made up about one-tenth of the total included heavy surface or boiler-feed pumping, carpenter and machine shops that serve other mines and the crushing and screening of coal before shipment to washeries.

A table of statistics on power consumption at the 50 mines failed to give basis for any definite general conclusions or any consistent relationship between the six classifications. Hoisting, for instance, ranged from 1.4 per cent to 50.8 per cent, ventilation from 2.2 to 61.9 and haulage from 4.6 to 67.1, thus making plain the fact that "every mine is a problem of itself." Mining, haulage and ventilation showed a consumption of two-thirds of the total.

Dividing Mr. Hoskin's percentage figures on power consumed under the six headings and grouping the 50 mines into 5 groups of 10 mines each, this table results:

POWER DISTRIBUTION IN MINES OF FIVE CLASSES

Tonnage Per Day	Hoisting	Ventilation	Pumping	Mining	Haulage	Misc.
Below 2,000.....	19.0	34.6	7.5	31.2	19.2	10.0
2,000—2,500.....	17.8	25.7	4.2	25.1	17.6	11.5
2,500—3,000.....	14.8	20.5	10.2	17.4	28.4	11.0
3,000—4,000.....	18.0	24.3	6.6	24.9	23.9	8.2
4,000 and up.....	17.0	17.2	1.2	22.5	30.7	11.4
Simple average...	17.5	24.5	6.1	25.1	24.5	10.1
Weighted average	17.2	22.2	5.0	24.1	26.2	10.5

In attempting the difficult determination of power costs Mr. Hoskin said he encountered all sorts of obstacles, chief of which was the incompleteness of the records of Illinois mining companies. In most cases, he said, such costs are not distributed to the final consumers of power. A common practice, he said, is to combine haulage and mining as one item.

At mines which purchase power the exact total, of course, is known but hardly any attempt is made to allot it. As to locally generated power, about all the operator knows is the total as recorded on the switchboard. Mr. Hoskin said little is known even of the cost of operating boilers. Data are as difficult to get from steam mines as from any other.

Because of the difference in the value of coal and because of various other items, Mr. Hoskin said it seems almost impossible to arrive at any common and comparable system for figuring power costs at different mines. Some superintendents say they burn nonsalable coal that has no market value and therefore cannot be charged against power.

Others, in attempts to fix their charges fairly, figure them on the mine-run cost of coal for the preceding month, a few burn whatever grade of coal gives best efficiency and charge it at the prevailing market price, and some strike an average for a whole year from the 12-month average, thus putting themselves on the same "annual contract" basis as most big consumers.

Then there always is the question, "Should we charge at market rates or at the production-cost level?" Whatever the system followed, Mr. Hoskin believes 75 per cent of the power cost is boiler-room expense. He asked his hearers for assistance in determining some fair basis for figuring these costs, so vital to the coal-mining industry.

In a written discussion of the paper, Carl W. Lee, engineer of the Peabody Coal Co., proposed that power for all uses be reduced to kilowatt-hour per ton basis and suggested some subdivisions of uses that would make cost determination easier. He thought coal should be figured at a final average cost per month. F. F. Jorgensen, general superintendent and chief engineer for the Superior Coal Co., at Gillespie, Ill., said the average market value for the year is a good basis for all except industrial mines, where this average must be assumed, as the coal is not marketed.

Another speaker called attention to the facts that power consumption is directly affected by which of the various hoisting methods was adopted, by the condition of the track and haulage equipment, by the age and condition of the fans, by errors in pumping, such as permitting pumps to "run on wind," and by power losses in transmission, all of these adding elements that would have to be considered in figuring power costs.

J. C. Quade, chief engineer for Big Creek Coals, Inc., said his company's six mines, operating under widely variant conditions, find the kilowatt-hour or the horsepower-hour the best basis. E. G. Lewis, of Sandoval, and J. H. Haskins, of Danville, both agreed that the actual production cost, not market price, should be the basis. D. D. Wilcox, general superintendent of the Superior Coal Co., pointed out that on account of the variation in value of coal between mines, price is not a fair basis, but some basis of fuel value is.

F. W. DeWolf, chief of the State Geological Survey, followed this by suggesting that the British thermal unit basis be adopted. Mr. Hoskin ended the discussion by asking again that the coal men of the state help him to find the answer to the vexed question and said that if they gave him the efficiencies at points of consumption and helped him arrive at a fair basis for fixing the value of coal, they would be performing a real service to the industry.

Mr. Quade described by word and picture the new No. 4 mine of his company—Big Creek Coals, Inc.—west of Harrisburg. It is calculated to become a 5,000 tonner, though now it is hoisting only through the airshaft. The main entry is driven through from shaft to shaft and development work is going steadily ahead. The concrete work in shafts and bottoms struck the institute as being particularly striking and handsome. Some of the underground pictures shown with slides made the mine look more like a monastery than a coal pit.

Harold E. Culver, who is working under the cooperative agreement of university, state and government, spoke interestingly on the work he is doing toward identifying more accurately the various seams of coal of Illinois, suggesting that it is entirely possible that the seams the mining men know so well might possibly be correlated as between fields. The usual earmarks such as distances of a seam from the surface, thickness and nature of roof, solidity of floor, appearance of "blue bands" and the like may not be infallible. The fossil shells and plants in the caprock on No. 6 seam are found in varying thicknesses of rock and in rock that does not overlay any coal at all. Thus they may not be true indexes of specific coal beds.

He said he had been trying to find the answer in the sequence in which various strata were laid down. The biggest difficulty in the way of this determination, he said, is the fact that limestone, shale and sandstone were laid down in different places at the same time. One or the other may lie directly on top of a given seam of coal in different parts of even a single county. It is necessary to know the conditions under which each was laid, whether under sea, at the water's edge or inland by streams. This is a complicated question. Mr. Culver said he hoped the operating men of the state would give him all the data available when he asks for it, which will be on occasions both soon and frequent.

THE U. S. BUREAU OF MINES and the Public Health Service, cognizant of the importance of dust in the causation of pulmonary disease, have conducted numerous studies on the quantity and nature of dust in mine and factory air. A new instrument for sampling aerial dust devised by Leonard Greenburg, assistant sanitary engineer, retired, U. S. Public Health Service, and George W. Smith, junior physical chemist, Bureau of Mines, makes use of the principle of impingement of the dust-laden air at high velocity on a wetted glass surface together with that of bubbling the air through a liquid medium. This apparatus consists essentially of three parts: a hand pump or electrically driven blower, a flow meter, or other suitable means of measuring the air passed through the instrument, and the dust-collecting device. A description of this new dust sampling instrument is given in Serial 2,392, which may be obtained from the Bureau of Mines, Washington, D. C.

Insulating Oils Are Decomposed by Passage of Current; How to Keep and Restore Their Dielectric Strength

Heat Raises an Oil Vapor but Disruptive Discharge Releases Hydrogen—Sludge Is Formed by Oxidation of Overheated Oil —One Part of Water in 50,000 Will Render Oil Unfit for Use

By E. J. Gealey
Kingston, Pa.

TRANSFORMER oil, using the word in its larger sense, covers the oil used not only in transformers but in oil switches, lightning arresters and feeder regulators. It is used for many purposes, insulation being among the more important. This it may effect directly or by its action in excluding moisture. It is circulated through windings for the purpose of carrying away the heat generated therein. It serves also as a preservative and as a means of extinguishing arcs.

Tranformer oil is a product of mineral oil and is a member of that hydrocarbon group which begins with methane or marsh gas (CH_4) and includes a long series of compounds of increasing molecular weight, the members of the group containing gases, liquids and solids. Kerosene and gasoline are representative of the lighter oils while lubricants and transformer oils are exemplars of those that are heavier. The solid members of the group are paraffin and its analogues.

As the molecular structure is changed, the specific gravity, the specific heat, the viscosity, the volatility, the dielectric strength and other properties are changed, as also the relative flash and fire points, the insulating and cooling qualities.

As hydrocarbons are inflammable under certain conditions of temperature, pressure, air admixture and ignition, their use must be safeguarded. Fortunately these conditions are so rarely obtained in combination that in most instances the hazards involved in the use of the heavier oils are quite negligible.

Distillation vs. Dissociation Products

When the gases formed as a result of this disintegration are analyzed it is found that hydrogen preponderates and that there is a relatively small quantity of hydrocarbons. In view of the violence with which oxygen and hydrogen unite even when the former is only in such concentrations as are found under ordinary atmospheric conditions, it is easy to understand how great a destructive force can readily be obtained from the ignition of an atmosphere of air and decomposed oil.

On the passage of a disruptive discharge hydrocarbons form gases, at or below the oil surface, that differ radically from the oil vapor that is formed as the result of a gradual increase in the temperature of the oil. The accumulation of oil vapor that forms the basis of the flash-point test is still essentially one of oil and consequently the vapors will condense when the temperature is decreased, resuming their original character. On the other hand, the gases resulting from the disintegration of the oil molecules consequent on disruptive discharge are permanent over ordinary temperature ranges. These facts are not generally appreciated.

Though the explosion of a mixture of air and disintegrated oil is more destructive than a mixture of air and oil vapor, it has proved to be of rare occurrence, and when it happens it is usually traceable to some neglect.

A good transformer oil for general purposes should have the following characteristics, viz: a high dielectric strength, a high flash point, a high burning point, a low freezing point, low viscosity (when measured in the time in seconds required for a given quantity of oil to pass through a standard orifice at a definite temperature), a minimum tendency to form a sludge and a freedom from acid, alkali, sulphur, wax, animal or vegetable oils or fats, or other soluble matter.

The great enemy to transformer oil is water. The deleterious effect of small quantities of moisture on the dielectric strength of oil is now recognized by nearly all who use it, but it appears to be even more serious than is generally supposed. Fig. 1 shows clearly the effect of moisture on the dielectric strength of oil.

For high-tension work the classification in Table I is sometimes used in comparing oil.

TABLE I—DIELECTRIC STRENGTHS OF TRANSFORMER OILS

0 kv. to 15 kv.	Unsatisfactory
15.0 kv. to 17.5 kv.	Doubtful
17.5 kv. to 20.0 kv.	Satisfactory
20.0 kv. to 22.5 kv.	Good
22.5 kv. to 25.0 kv.	Excellent

Owing to the confusion which has arisen from the use of different standards it may be necessary to add that Table I is for use with the so-called new-style test gap. The old-style gap was made of electrodes having a ½-in. face and set 0.2 in. apart; the new-style

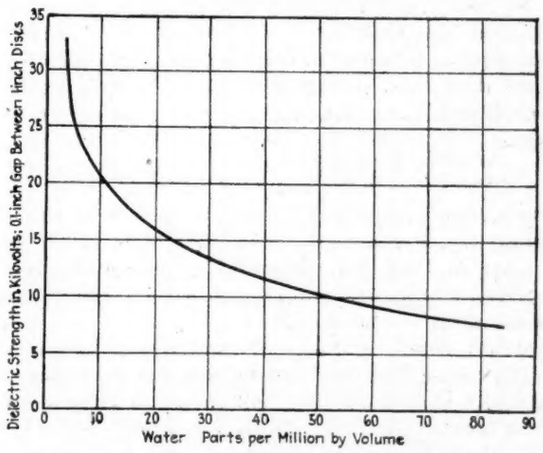


FIG. 1—CHART SHOWS HOW RAPIDLY DIELECTRIC STRENGTH INCREASES WITH FREEDOM FROM WATER

Insulating oils as purchased are free enough of water to be of high dielectric strength, but moisture can be kept out of the oil only by vigilant care. Even when in the barrel the oil may absorb moisture. Water condensed on the sides of the receiving vessel is a common source of the moisture by which the dielectric strength is reduced.

test gap has electrodes having a 1-in. face and set 0.1 in. apart. An oil testing 40 kv. with the old-style gap will test about 22 kv. on the new-style gap. It is, therefore, important in considering the dielectric test of an oil to know the style of gap used.

As shown by Fig. 1 and Table 1, an oil having so small a proportion of moisture as 2/1,000 of 1 per cent would be unsatisfactory. Small particles of dust and other foreign matter, especially when metallic, are almost as pernicious as water in reducing the dielectric strength.

The flash point is a definite temperature at which vapors are given off which can be ignited by a match or other source of flame. The lowest temperature at which these ignitable vapors are given off is termed the flash point. When the rate of evaporation is sufficient to maintain a mixture of vapor and air which will burn and support combustion, the burning temperature has been reached.

Low viscosity is another important requisite for transformer oil. By viscosity is meant the relative fluidity, or what is sometimes called the "body," of an oil. It is necessary that transformer oil be of low viscosity, for it is essential that the heat generated in the coils be quickly dissipated. When the oil comes in contact with the heated coils it also becomes heated and rises to the surface, where it again becomes cool. Thus the oil carries away the heat of the transformer. Unless this is done quickly and efficiently the coils will develop hot spots with their attendant dangers.

Degeneration of the Body of the Oil Itself

Aside from matter such as dirt, dust and fine particles of carbon which get into it from an exterior source, transformer oil is made ineffective by the formation of "sludge." This is developed by oxidation of overheated oil, that excessive heating being due to improper ventilation, overload or overvoltage. Analysis has shown also that this sludge often consists of impregnating compounds which have been precipitated in the oil, due to improper treatment of the compound during the impregnating process.

This sediment reduces the fluidity of the oil, thus impeding its circulation and clogging the oil ducts. A gummy colloidal substance is deposited on the coils and on the tank thus preventing the proper dissipation of heat from the windings. The retention of this heat causes the transformer to become overheated even under normal loads, and in this way cuts down the capacity of the transformer and increases the tendency to form sludge.

Specific Needs of Circuit-Breaker Oils

For circuit breakers the requirements as to sludging and heat transference do not hold so important a place, but there is a greater danger of oil being splashed in the presence of flame. A high flash oil, therefore, should be used in circuit breakers.

A heavy short-circuit in a transformer, sufficient to trip the circuit breaker, usually is of too short duration to produce conditions that will cause an explosion. A partial short-circuit, continuing for a long period at or below the oil surface, however, will, as mentioned before, result in the accumulation of a large quantity of hydrogen, which may cause a powerful explosion on the passage of discharges through the gaseous mixture. To prevent such a discharge and the consequent release of destructive forces it is desirable to maintain the oil at a proper level above the terminal boards.

It is, therefore, important that oil be kept in its original condition, as it is quite possible to get a transformer oil of the best grade and yet have trouble if the oil is not given the proper care.

All oil in unsealed drums and even all oil in drums that are sealed but which have been stored where they were exposed to the weather should be tested before using by taking a sample from each drum. Drums stored out of doors always should be placed on their sides, never turned up on end. The chimes should never be allowed to lie in pools of water, nor should water be allowed on the heads when the drums are in a vertical position. Outdoors storage of oil always is hazardous and to be avoided if possible. When drums are stored out of doors they should be protected against direct precipitation of rain or snow.

Extreme precautions are required to insure that containers used for transferring oil be clean and dry. A drum of cold oil when taken into a warm room will "sweat" and the moisture thus formed may mix with the oil when drawing it from the drum.

To filter out some of the scale formed inside a drum of oil the oil should be first slightly heated and filtered through about two or three layers of ordinary finely woven cotton cambric that has been thoroughly washed and dried. It is highly desirable that all the remaining scale be taken from the oil by a suitable filtering machine.

Periodic inspection and tests should be made to determine the quality of transformer oil. These tests will determine the necessity for dehydrating and purifying the oil if it has absorbed moisture or acquired sediment.

Large users of transformer oil are becoming more and more converted to the necessity of taking these precautions. Where this practice has been followed in a systematic manner it has been found that failure of apparatus from burnouts, and "unknown causes," with subsequent interruption of service, has been reduced to a minimum and a resulting economy in the use of oil has been effected.

In Testing Choose Worst Oil in Transformer

The oil used for inspection and test should be taken from the lowest point in a transformer tank so that any sediment or moisture in the oil will show up in the sample. The sample should preferably be taken after one or two bucketfuls of oil have been drawn off the tank.

In the commercial testing of oil, small flat disks with sharp edges usually are employed as electrodes, so as to combine uniformity of field with edge effect.

Fig. 2 shows an oil-testing cup. The gap is locked in position after being set against a feeler gage. The cup is made of a composition, usually of hard rubber. The interior of the spark gap is perfectly smooth and symmetrical so that there is no tendency for dirt to collect. When the spark gap is used on the testing transformer it is supported and insulated by the high-voltage terminals.

The testing transformer usually has a ratio of 110 to 25,000 volts. The control consists of an air-cooled auto-transformer with regulating taps, connected to a selector switch. Dial contacts are arranged to give 15, 17.5, 20, 22.5 and 25 kv. on the high-tension winding of the transformer.

When making a test of an oil the cup is first thoroughly cleaned, usually with benzine, and then washed out with a small quantity of the oil that is to be tested.

The gap having been accurately set, a sample of the oil is put in the cup and allowed a short time to settle; the voltage is then applied to the electrodes of the test gap and gradually raised until the gap breaks down or the oil takes the full 25-kv. test.

After each discharge it is essential that the test cup and electrodes be washed free of any carbon or other foreign material. The disruptive breakdown of oil under dielectric stress is not due entirely to the voltage exceeding the dielectric strength of the oil, as is the case with air, but is due to some extent to something being carried into the dielectric field or being produced in that field which weakens the dielectric strength so as to cause a premature breakdown.

This material may be particles of moisture, dissociation products of the oil, olefines, fats, fatty acids, dust fibers or combinations of them, in solution or colloidal solution or suspension in the oil. For this reason it is always best not to disturb too greatly the sample under test before applying the voltage test.

A small bright spark may pass across the gap without causing the testing circuit to open. When this occurs this discharge should not be regarded in recording the results of the test because it usually is due to minute air bubbles which have not had time to escape from the sample after being poured into the test cup.

The dehydration and purification of transformer oil may be accomplished by either the filtration or the centrifugal method. In the first the oil is pumped under pressure through a filter press consisting of several layers of dry blotting paper. The solid matter in the oil is caught by the paper, and the water is retained by capillary action. The capillary attraction between the paper and water is greater than that between the paper and the oil. The effectiveness of the method is dependent mainly upon this fact.

The other method consists of pumping the oil into a machine where after heating and delivery to the top of the purifier it flows into a revolving bowl. Here it is dehydrated and purified. Both methods may be used when the transformer is in operation. The best results will be obtained by following the instructions of the manufacturer of the machine.

The successful operation of transformers, oil switches, lightning arresters and feeder regulators, therefore, depends to a large degree upon the condition of the oil, which should be systematically inspected at least twice a year. Low-tension equipment does not necessarily require an oil with high dielectric strength, but as a very small quantity of moisture will seriously lower the dielectric strength of the oil, the best method to pursue is to keep the oil up to standard test, namely, 22 kv. new-style gap.

It is also to be remembered that the oil level always should be maintained so as to prevent flashes above the oil surface and the consequent disasters which may occur, and special care should be taken to have no condition which will decompose the oil and form highly explosive mixtures above its surface. It is undoubtedly this latter condition which has caused lightning arresters and switches to blow up, thus initiating severe fires.

The following are the approximate characteristics which oils for specific purposes should possess. They may be used as a guide in the selection of transformer oils.

For use in aluminum-cell lightning arresters, starting compensators and oil circuit breakers not subjected to temperatures below 0 deg. C.: Flash point, 185 deg. C.; burning point, 210 deg. C.; freezing point, —10 deg. C.; viscosity at 40 deg. C., 105 sec.

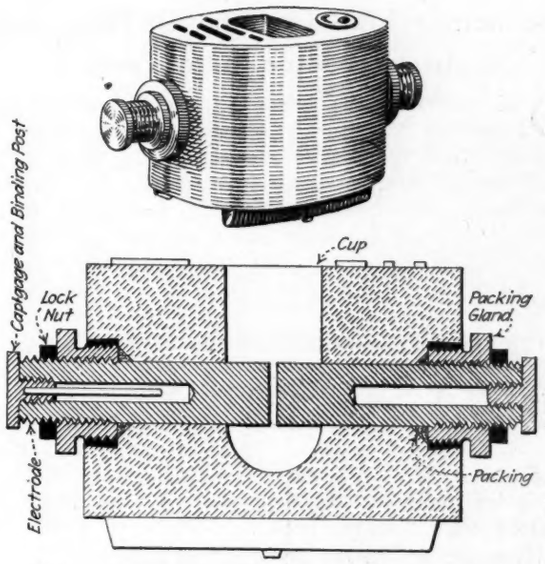


FIG. 2—TESTING CUP FOR INSULATING OIL

This cup is held by the terminals of a transformer which is under the cup and forms an integral part of the equipment.

For oil-cooled, water-cooled and combination oil- and water-cooled transformers, also for feeder voltage regulators, except for outdoor installation in cold climates: Flash point, 140 deg. C.; burning point, 155 deg. C.; freezing point, —5 deg. C.; viscosity at 40 deg C., 52 sec.

For outdoor oil circuit breakers when subjected to temperatures below 0 deg. C., also for the dashpots of time-limit attachments: Flash point, 155 deg. C.; burning point, 180 deg. C.; freezing point, —30 deg. C.; viscosity at 40 deg. C., 100 sec.

THE UNITED STATES contains 12,000 square miles of unused peat land, an area more than 10 times that of Rhode Island, capable of yielding fourteen billion tons of fuel at a cost of $1.50 to $5 a ton, according to a comprehensive bulletin on the subject just issued by the U. S. Geological Survey. The deposits are on the surface and lie in the New England, Atlantic Coast and Great Lakes states, most of them in regions remote from coal mines. This bulletin, which is the most exhaustive American work on peat and required two years for its preparation, points out the location of thousands of deposits, owned by thousands of farmers and other landowners. Fifty million tons of peat is used annually as fuel in Europe. Peat is suitable also for use as a fertilizer and in promoting the intensive growth of truck crops, both in greenhouses and in open fields. Those interested in peat may obtain free copies of the bulletin by addressing the U. S. Geological Survey, Washington, D. C. It was prepared by C. C. Osbon and is published as the Geological Survey's Bulletin 728, entitled "The Occurrence and Uses of Peat in the United States."

LIKE THE EASTERN INTERIOR REGION as a whole, of which it forms a part, the western Kentucky field produces railroad fuels chiefly, states the Bureau of Mines, in a recently issued paper on Kentucky coals, 30 to 35 per cent of the entire output of the district being used by railroads, a proportion somewhat above that for all bituminous coal mines in the United States. Little coal from western Kentucky is sold for the manufacture of gas, although about 12 per cent of it is taken by electric-light and power companies. The district produces also a lump coal that finds a wide market for domestic use, and about one-fourth of the output is shipped to retail dealers. A little coking coal is produced.

Something Like This May Be Happening In Your Mine, Right Now!

O. K. BROWN, the clean-cut, efficient general manager of the Burnless Fuel Co., with mines at Nocoal, North Mississippi, after having read with a good deal of interest, the printed matter sent out by a well-known manufacturer of mining machinery, exploiting an improved mine-car loader, decided that mechanical loading was the proper thing for his otherwise up-to-date mine, and ordered one of the machines for trial.

Prior to the advent of the loader, Mr. Brown visited his mine, and after talking over matters in general with Mike, the pit boss, as soon as he dared do so, sprung the news on that skeptical individual that he had purchased a mine-car loader. This statement immediately met with a storm of protests from Mike—he didn't want it; it was no good; they had used one over at Hardcut and chucked it on the gob.

However, Mr. Brown insisted that they must be up to date and use mechanical contrivances wherever possible, and insisted that Mike take the loader into the mine and give it a fair trial. After which Mr. Brown went upon his way and forgot the matter for the time being.

Enters then, the mine-car loader, which Mike promptly has unloaded from the car and stored outside the mine, where it can be cleaned by every rainstorm and where the wind can blow the dust off of it. There it rests for two weeks, after which time Mike condescends to place it in the mine for a "fair trial," being induced to do so by the receipt of several letters from the general office inquiring as to what progress has been made with the machine, also due to the fact that they had run into a fault over in 10th left, where there was about 3 ft. of rock and 2 ft. of coal, and this entry was getting away behind. Here, they decided, would be a good place to try the thing out.

The manufacturing company sent down a demonstrator and after several vexatious delays Mike gave him an electric drill with which to drill the rock, and some powder and a couple of men—one a Mexican who could not speak a word of English and the other a Hungarian by the name of Graboski—and told them to go to it. Graboski took to the loader like a duck to water, and thought it was great; said that if he had had that loader before it would have saved ten years of his life, as it was so much easier to load on to the end of the conveyor than to lift the material into a car—especially the slate. The Mexican, being unable to express himself, naturally said nothing, but did about as much work as one would expect from one of his race.

And so, under these conditions, the demonstrator tackled the job of making a hit with the loader and incidentally with his own company. Drilling the rock was hard and slow work; the shooting was a serious handicap, as they were away ahead of the air and had to wait a long time for the powder smoke to clear away. The cars (especially those loaded with stone) were too heavy to push the 300 ft., which unfortunately was on a steep grade against the load, and as Mike could not spare a mule the demonstrator went to the nearest town and bought 600 ft. of Manila rope and a snatch block, and by means of the capstans on the loading machine he managed to handle his cars against the grade. But in spite of this, had the car supply kept up, a favorable showing could have been made, but there were heart-breaking intervals between cars, when the machine would remain absolutely idle for long periods of time. A day or two later Mike wrote the home office about as follows:

> The mine-car loader was put to work in 10th left last Monday, but it ain't doing much good. It has been given a fair show, as it gets its turn of cars every time with the rest of the men, and I gave it some advantage because I gave the machine crew a power drill, while the crew that is loading by hand on a parallel entry is drilling by hand, but then again the crew on the loading machine has to push their cars about 300 ft. to the motor, and the other crew does not have to push the cars so far.

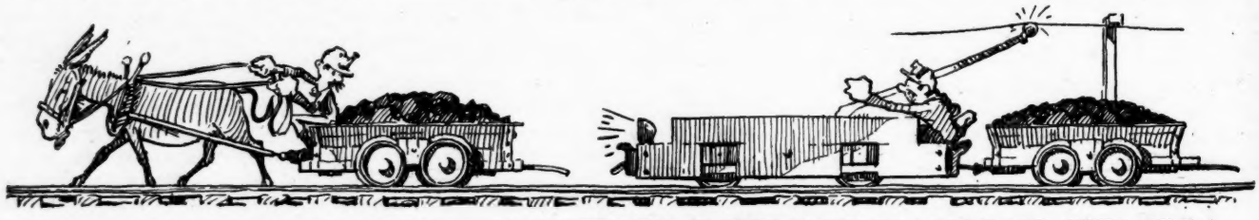
At this stage of the game the demonstrator had a little heart-to-heart talk with Mike, telling him that he must have more cars, because he was idle most of the time and didn't have anything to load his coal in. Mike insisted that he was getting "as many cars as he was entitled to" and that the "machine was installed with the understanding that it would be successful in their system of mining, and with their system everybody had to take his cars as they came—they couldn't favor anybody."

The loading machine kept on working under this alleged "system" for two or three weeks, when the demonstrator finally managed to get hold of extra cars occasionally, so that it was not long before he caught up with the 11th left.

In the interim Mike bombarded the general office with reports giving the number of tons of coal handled by the pit car loader per week, and how many tons the crew on the other entry had loaded (in clean coal—not mentioned in the report). The coal company's general office, studying these paper statistics, figured the cost of both entries according to the scale, and reported back to the makers of the loader that the coal cost much more when loaded by the machine than when loaded by hand.

Thereupon the manufacturers wrote their demonstrator and asked him "How come?" He explained the matter, and the general office went after Michael once more, but that equitable gentleman could not see but that he was giving the loading machine a "fair trial" and grew somewhat peeved at the demonstrator for insinuating that he was not getting a fair show; whereupon the demonstrator arose and spake about as follows:

"Look'y here, Mike; suppose, for instance, that you had never had mechanical haulage in this mine, and they sent down an electric locomotive for you to try out, and you handed the locomotive the same deal as you give me, and, for instance, give the locomotive a car of coal to haul, and give a mule a car of coal to haul, and the



WHERE WOULD THE MINE LOCOMOTIVE HAVE BEEN HAD IT BEEN PACED BY A MULE AND GIVEN ONLY A MULE'S CAR ALLOTMENT?

mule gets away first. Of course, as the mule is in front of the locomotive, the locomotive cannot make any better speed than the mule, and as it cannot jump over the mule, it arrives at the bottom after the mule does. Of course, when they return with the empties, the locomotive is in the lead, but after they get loaded up, the same state of affairs exists again, and as a result, the locomotive appears to be just about as efficient as one mule. Do you think you would be giving the locomotive a "fair trial" under such circumstances?" But Mike scratched his head and said, "It's different with a loading machine."

In desperation the demonstrator said "Look'y here Mike; you know that the locomotive can go faster than a mule, and admit that at the same time it can haul a whole trip of loaded cars?" "Yes," says Mike. 'You admit that the loading machine can load much faster than can be done by hand?", and Mike admitted that. "If the machine can load cars much faster, it can load a greater number per day, can't it?" and there being no way of getting around this logic, Mike finally admitted that maybe it would be a fair trial if he got some more cars, and then he said that he admitted the conditions were not good for getting a big output of coal.

At the end of the trial period they had not as yet gone through the rock, and Mike rather hated to give up the machine before he got through, as he had trouble in hiring anybody to work under the conditions, and he had to pay such as he did get good day's wages. So he took the matter up with Mr. Brown, and Brown wrote the manufacturers asking for a month's extension of the trial period, stating that while the coal cost more when loaded by the machine than when loaded by hand, they had advanced the entry faster than they did before, and were not ready to condemn the machine, but would like to give it a further trial. The trial period was extended another month.

In the meantime the demonstrator plugged away, driving entry. The rock grew thinner, and more and more cars were needed, but Mike, while he realized now that in order to give the loader a "fair trial" it would be necessary to keep up the supply of cars, was unable to do so, as they had only one locomotive in the mine and this was tied up in handling cars to other parts of the mine; so there were no means of providing cars for the loading machine.

At the end of the further trial period Mike had driven his entry as far as he desired, and consequently the manufacturers received a letter from Mr. Brown reading about as follows:

> The machine is not suited to our conditions, for these reasons:
> (1) It loads coal so fast that it requires a locomotive to keep the cars away from it, and we cannot afford to tie up a locomotive.
> (2) The coal costs more when loaded by the machine than when loaded by hand.
> (3) I do not want to finally condemn the machine, because we can drive entries with it about four times as fast as by hand, but that is of no advantage to us, as we need no more entry at the present time.

And the loading machine came home in unmerited disgrace.

Examining Coal in Incident Light

By Alfred Gradenwitz
Berlin-Friedenau, Germany

EXAMINATION of coal samples raises a multitude of problems of the highest importance to the scientist anxious to ascertain its nature and origin, as well as to the engineer intent upon investigating the industrial qualities of coal. Though the necessity of resorting to the microscope has in this connection long been realized, the method so far employed, namely, examining thin translucid sections, has involved many serious difficulties. Dr. H. Winter, director of a research laboratory at the Bochum (Germany) Mining College, therefore tried to apply to work such as this a method in current use in metallography, namely, microscopical investigation in incident light. His tests strikingly show the suitability of this method for the examination of opaque minerals such as coal, it not even being necessary in all cases to etch the ground and polished surfaces. Where this is done, however, it is best to use a solution of potassium chlorate and nitric acid.

An electric arc lamp was used in most cases, the light of which was allowed to strike through a lens system, water cooler, light filter and iris stop at right angles to the optical axis of the microscope, the "vertical illuminator," so-called, being arranged between the objective and eyepiece, the beams of light being reflected completely by the prism and illuminating the sample placed on the microscope table. It is also possible by means of a mirror to deflect part of the beams of light from their vertical direction to the microscope axis, directing them at a variable angle against the sample to be examined and making its structure visible.

According to Dr. Winter's results, every solid fuel, recent as well as ancient, possesses throughout its mass

FIG. 1—PITCH COAL

This sample of pitch coal from Germany has remarkable density and mechanic strength. Magnification 115-fold.

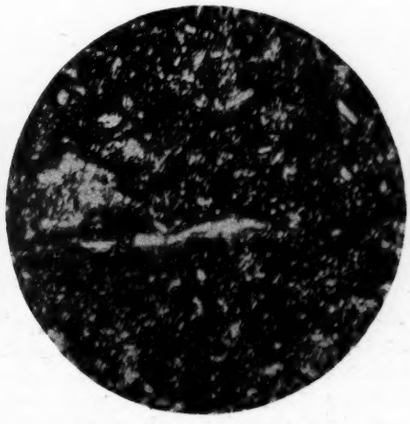


FIG. 2—CANNEL COAL

This coal less magnified than that in Fig. 1 is of uniform structure. Its magnification is only 65-fold.

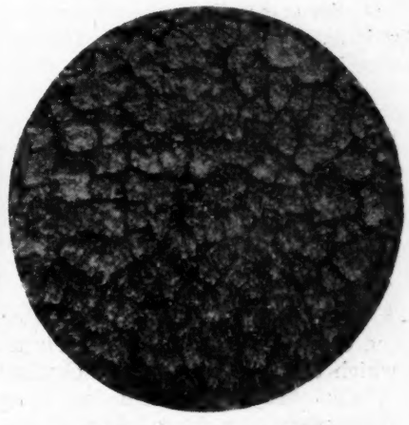


FIG. 3—PSEUDO-CANNEL

This cross-section, which looks much like a piece of creviced coke, has been magnified 115 times.

a characteristic structure, the photographic reproduction of which often takes prolonged exposure.

In peat, lignite and true coal, whether recent or ancient, Dr. Winter in incident light noted remarkable meshy tissues of round micro-cells, affording a valuable clue to the genesis of coal.

Fig. 1 shows a sample of pitch-coal (jet) possessing remarkable density, mechanical strength and uniform structure. The wood texture prevailing throughout the mass is apparent at first sight. Fig. 2 is a sample of cannel coal of uniform structure, though devoid of any stratification or slaty texture, the whole field of vision being filled up with rounded egg-shaped micro-cells. Fig. 3 represents in 115-fold magnification the appearance of a pseudo-cannel coal etched in a direction parallel to stratification. This allows polygons to be discerned distinctly, which most likely are cell walls of specific vegetable tissues, the whole interior being filled up with rounded egg-shaped micro-sells. Fig. 4 is a striated coal consisting of a combination of glance-coal and dull coal.

FIG. 4—STRIATED COAL
In this cross-section can be seen glance and dull coal in sequent bands. The magnification here is only 10-fold.

Taking into account the conversion of plants into peat as well as the chemistry of plants, especially that of the process, Dr. Winter comes to the conclusion that all kinds of coal, glance-coal as well as dull coal, should be considered as solid colloidal matter. In the case of some samples of glance-coal, microscopic examination in incident light affords convincing evidence of their being wood products, the longitudinal fibers and tissue bundles coming out most clearly after etching.

A Zeiss metallographic microscope, which, after an unimportant alteration, also allows of investigation in transparent light, was used in this investigation. The new process will doubtless contribute to elucidating a number of contested problems, especially if used conjointly with chemical analyses and occasional microscopic investigation of thin sections.

Bain Issues Timely Warning to Coal Men

HOPING to reduce the present deplorable frequency of mine explosions, H. Foster Bain, Director of the U. S. Bureau of Mines, has issued a statement from which the following paragraphs have been taken:

"Coal has been mined for three months since the resumption of mining following the five months' strike and in that time six explosions, killing about 185 men and injuring more than 150 others, have occurred in the bituminous mines. The number and violence of these explosions is increasing, the record of the past month being the worst of all. The coal industry has not in years suffered as many big disasters and the entire country is properly aroused.

"Coal producers have been properly striving to produce a maximum output to meet the expected heavy demands of the winter trade and to overcome the inroads which had been made in the coal reserves during the recent strike, and intensified activity in any industry increases the risk of accident. The seasonal hazards, which are greater in the coal industry during the winter months, probably have influenced the result. There has been a lessening of morale throughout the coal industry as a result of the strike, which tends toward a less careful attitude of mind. Another probable factor is the change in personnel at the mines following the strike and the shifting of miners to camps where they are not familiar with the dangers, and in places there is a lack of that discipline which is essential to the prevention of disasters whether in fighting a battle or in combating the hazards of nature.

"The letdown of morale on the part of the individual miner is indicated by a startling increase in the number of accidents caused by falls of roofs or of coal falling at the working face. The prevention of such accidents is almost wholly a matter in the hands of the individual worker. In the matter of explosions, however, there is a collective responsibility which begins with the individual whose act or carelessness is the cause of the accident and continues to the operator who permits mining conditions that allow the extension of a local explosion into one spreading through the mine.

"Two effective methods of preventing the extension of explosions by coal dust have been demonstrated in the experimental mine of the Bureau. The first is to wet the dust thoroughly so that no dry dust remains in the mine. The coal dust is made into a mud which cannot be thrown up into suspension in the air by concussion. It is this throwing it up in a cloud along the entry that permits the flame to pass from one volatile particle to another which, when rapid enough, becomes an explosion. It is also possible to dilute the coal dust with shale dust or limestone dust or any non-inflammable dust so that the explosion will not pass from point to point even though a dust cloud be raised by the concussion of blasting or by the wreckage of a trip of cars.

"Either method is effective. The objection to the wetting down is that it must be done every day and must be thoroughly done to be effective. The second greatest coal-mine explosion disaster in this country followed the omission of watering over two days. The shale-dusting method is required by law in Great Britain, where there is dangerous dust, and it is officially approved in France.

"Only eighty-one hundredths of an ounce of coal dust per cubic foot of air space in mine passageways, or 5 oz. per lineal foot of an entry way of ordinary size, which is barely enough to make a thin film when spread on the surface, will propagate an explosion. Treatment methods of some sort are, therefore, necessary.

"Miners and operators, as well as the official inspectors, must take hold of the situation promptly and vigorously or there will be still more serious explosions and more men killed. Knowledge not applied is of no value, however practical it may be in its bearings."

Problems of Operating Men

Edited by James T. Beard

Relative Merits of Retarding Conveyors and Gravity Planes

Unfair Comparison of Retarding Conveyors and Gravity Planes—Delays in Operation of Gravity Planes of Shorter Duration Than with Conveyors

UPON reading the article of Charles M. Schloss in which he describes Utah's only coal-retarding conveyor, *Coal Age*, Nov. 2, p. 717, I feel that the author has been a little unfair in recounting only the good points of the conveyor and the weak points of gravity planes.

As stated in the article, Utah can boast of but one retarding conveyor, in operation at its mines. In justice to the many gravity planes in operation in the state, I feel compelled to give some of the good points possessed by these self-acting inclines and, at the same time, mention a few of the weak points in a conveyor installation.

Record Tonnage and Slight Delays on Operating Inclines

In the first place, it is a matter of record that, by far, the largest tonnages ever produced in Utah have been hauled over gravity planes. These planes are so built that, nine times out of ten, a runaway trip will be caught by a derailing switch and thrown into the clear, thus preventing further damage than the wrecking of the trip, and, possibly, spreading a few rails.

When this occurs, as it will at times, the rails are quickly spiked to gage and operations resumed in a very short time. While runaway cars or trips are always liable to occur, in the operation of a plane, care and good management will render these accidents less frequent.

In his article, Mr. Schloss quotes a prominent engineer as saying, "I have never known a retarding conveyor that has been built right to cause any serious delay; but every so often you hear of a trip getting away on an incline plane."

Numerous Delays Cited in Operation of Conveyor

To my personal knowledge, in the operation of the conveyor he has described, there have occurred two full days' delay, on one occasion, when the tipple shakers were stopped and the conveyor continued to run, piling up the coal at the bottom, until the 5-in. main drive shaft of the shakers was broken.

Several other delays of a day each were caused by the burning out of the armature of the motor driving the conveyor. These accidents were due to the conveyor being left in operation while the tipple was at a standstill. At another time, a delay of three days was caused by the jerking loose of the bull gear, at the end of the conveyor, tearing it from its foundation.

Necessity for Relining Conveyor Causes Delay

This same conveyor is now being relined throughout its entire length of 436 ft., with $\frac{3}{16}$-in. steel plate. This expense, together with numerous smaller items, will easily offset the cost of maintenance of a gravity plane and the alleged extra wear and tear on the mine cars passing down and up the plane.

In his advocacy of the conveyor, for handling coal, the writer of the article failed to mention an important fact favoring the installation of a plane for that purpose. For instance, when a conveyor is installed, it is necessary to build an incline or plane for hoisting men and material from the tipple to the mouth of the mine. It is needless to say this extra expense is obviated when a gravity plane is installed to handle the coal.

Greater Number of Cars Required Operating Gravity Plane Offset by Advantages

It is true, as the article states, that more cars are required in the operation of a gravity plane than in that of the conveyor. However, the terminals on a gravity plane can always be so arranged that three loaded trips are on hand ready for the tipple, while a conveyor system permits the handling of a single trip only at one time.

This feature goes far to offset the loss of time when trips do not arrive regularly at the mine entrance, and dumping operations at the tipple must cease till more cars arrive. In my opinion, this feature will account for the larger tonnages handled over gravity planes, as compared with a conveyor system.

One other point remains to be mentioned. It is stated in the article that, in the operation of a gravity plane, it is necessary to have a crew at each terminal, and the claim is advanced that the use of a conveyor eliminates one of these crews, whereby a considerable saving in the cost of operation is effected.

This is not a fact in actual practice, however. At nearly all Utah mines operating gravity planes the terminal at the mine entrance at the head of the plane is handled by the motorman or the rope-rider, as the case may be. In each instance, these men take the place of a crew, at the head of the plane, when bringing a trip of loaded cars out of the mine.

George A. Schultz.

Latuda, Utah.

Suggestions for the Government's Fact-Finding Commission

Unwarranted waste in the mining of coal—Low grade coal discarded—Strife between operators and miners calls for government action.

ALL right-minded men will mark with pleasure the announcement that the government's Fact-Finding Commission, charged with making the necessary investigations to ascertain reliable facts in respect to industrial conditions, is already taking form, as stated in *Coal Age*, Nov. 9, p. 763.

The present condition of the coal industry presents a wide field for the work of this commission. As I reflect on the numerous things that will stand investigating at the hands of this commission, there are two points that appeal to me as calling for their consideration, if the peace and prosperity of our country are to be maintained and the benefits realized.

When I think of the unwarranted waste of coal, both in the mining and the preparation of the product for market, there is nothing with which it will bear comparison better than our slaughter of the buffalo for its hide, years ago, before the government took steps in its prevention.

Government Stopped Slaughter of Buffalo; Why Not Halt Waste of Coal?

Many will remember that a few decades ago, the herds of buffalo roaming the prairies were being literally slaughtered for their hides, while the meat was left to rot on the plains. This continued until the herds of these valuable animals would soon have become extinct, which was prevented by the government taking measures to stop the slaughter.

During the past thirty years, I have worked in most of the coal fields in this country and have observed the waste that is going on everywhere. This should be restricted by the government. In many places, the low-grade coal is either left in the mine and entirely lost, or taken to the surface and thrown out on the waste dump.

In other places, by reason of wrong methods of mining, millions of tons of high-grade coal have been lost beyond recovery. If the government could stop the killing of the buffalo for his hide, certainly the law should take some cognizance of the waste of these natural resources that abound in our country.

It should be remembered that nature, for ages past, has been creating these resources for the use of man. Is it too much, then, to ask that our government should make a thorough investigation and adopt measures that will restrict the waste of coal and compel the use of methods that will insure a 90 per cent extraction of the deposit?

Building of Byproduct Plants to Conserve Resources

It is only a suggestion; but, in some cases, investigations may show that it would be practicable to build plants, in certain coal fields, for the purpose of extracting the numerous byproducts from low-grade coal that would otherwise be lost. That this is important, in the present advanced age of knowledge, no one will deny.

Not only would this be a conservation of Nature's resources for coming generations, but greater safety in the mining of coal would be assured. Incidentally, there would be provided employment for men in ways that would be remunerative in the life of communities.

In the seam where I am now working, there is something like a foot of low-grade coal, together with from two to three feet of cannel coal. Practically all of this goes to waste at the present time; but, that is only one instance in many where a Fact-Finding Commission would be a benefit.

Another field that offers work for this commission is the reasonable control of the labor unions by government. Only such a calamitous condition as the present, brought about by the failure of coal operators and miners to agree on a suitable wage scale, can emphasize the need of government restriction of these activities.

For years our government has assumed a certain control of interstate commerce, and fixed passenger and freight rates on railroads; and there is, now, every reason for the government to assume a similar control of the coal industry.

At the present stage of the game the government has no power to say what constitutes a fair day's pay; or to fix the selling price of coal, per ton, at the mine. Had our operators and miners been wise, they would have both accepted the advice of the government to agree on their matters long ago.

The fact is plain that if an organization becomes a controlling factor in the affairs of a nation, the time will be short when that nation will cease to exist. This is not to question the right of men to organize for mutual benefit and protection; but that right must not conflict with the public good and welfare, which the government is pledged to protect.

Let me say, in conclusion, that we can hope for no industrial peace or prosperity without our government maintaining a controlling power. Success to the Fact-Finding Commission in their endeavors to establish a wise and equitable control in the government.

C. W. Atkins.

Parnassus, Pa.

Mine-Safety Conference

Recent conferences on mine-safety problems—Need of certification of mine officials—Reasonable laws respecting gas in mines.

It was with the deepest interest that I read the letter of Robert A. Marshall, *Coal Age*, Nov. 16, p. 799, drawing attention to the recent conferences on mine-safety problems and the results as outlined in the recommendation offered by the Federal Bureau of Mines, and set forth in a circular letter issued by the Colorado Fuel & Iron Co., to their employees.

Chief among these recommendations appears the emphasizing of the need of certifying all mine officials, including mine superintendents. The recommendations relate to those officials having direct charge of underground operations. The matter is particularly significant, coming as it does from one of the largest coal corporations in the West.

Heretofore, some opposition has been manifest on the part of mine operators toward certificate laws. This developed principally in Pennsylvania and resulted in the certificate law, in that state, being changed in a manner authorizing operators to employ uncertified men who were, in their judgment, equally competent with men holding certificates.

Assumed Reason for Revising Certificate Law

To my mind, some operators wanted a wider range of choice; they wanted to go outside of the certified list in selecting men to take charge of their mines. Frankly, I would say that the fact of an operator not being able to find the right person on the certified list is evidence that something is wrong. If certified men have not the knowledge and ability to manage mines placed in their charge, much less can we look to uncertified men for such capability.

Evidently, there is need for more study. As has been suggested by different writers in *Coal Age*, many of our certified men cease to study after they have once obtained their papers. If that condition is permitted to continue, our coal-mining problems will become more deplorable and difficult, as time goes on. This is saying much, as it is hard to understand how the situation can be more deplorable than it is at the present time.

Allow me to suggest here that there is one thing lacking among all coal operators and others holding positions that would enable them to combat the present low standard of our coal-mining laws. There seems to be a deficiency of moral courage to agitate what would improve the situation. Selfishness and greed are largely responsible for the failure to act on the principles of the Golden Rule, so often referred to in these columns.

Need of Equable Laws

Attention has been drawn to the need of making our laws more reasonable and such as would not work a burden on some mines while favoring others in the same state or district. In this connection, particular reference was made to the classification of mines as gaseous or non-gaseous; and it was explained how this classification was unjust, in many instances.

In our own State of Indiana, we have a shotfirer's law, which applies with reason to mines generating gas, but is unjust to mines having no gas. In these latter mines, the law is largely ignored as being unnecessary in their case. This fact makes the law inefficient and instances are not wanting where the law is disobeyed in mines to which it should apply.

Speaking of shotfirers, I understand that their wages vary from $7.50 to $25 a day. If this is so, it is a case for the Fact-Finding Commission, recently appointed by our government, to investigate. Certainly, the conditions in a mine where shotfirers are paid this high wage must entail an enormous hazard to life and property and should not be permitted to exist.

W. H. Luxton.

Linton, Ind.

No Need for Discouragement

Application for work refused—Applicant discouraged—Honest effort will eventually receive its reward.

While I am not much of a hand in writing, it is always a pleasure to me to read the different letters giving men's experience regarding their work. Some time ago I recall reading an article that interested me deeply. It was a letter written by a man who had applied for a position that he thought himself capable of filling. For some reason, I do not remember just the circumstances in the case, his application was refused.

Instead of accepting the situation and realizing that the company did not need any one at the time, the man became discouraged. It appeared that he laid his misfortune to a general run of bad luck, which made it all the harder for him to keep up his search and find what he wanted.

Because a man's application for a certain position fails to get him a place, is no reason why the fellow should be-

come discouraged. Such a frame of mind unfits a man for service of any kind. Let him take heart and it will not be long before he will find a place waiting for him where the company are looking for honest and reliable men.

After an experience of 32 years in coal mining, much of the time being occupied in bossing or superintending, I feel that men need encouragement and help, and we should seek every opportunity to assure them of our good will. CHARLES TROYE.

West Terre Haute, Ind.

American vs. Foreign Miners

Teaching rudiments of mining in the common schools—Mining experience wanting—Accident list due to employment of foreigners—Co-operation needed to make mining more attractive.

IN HIS article "Teach Rudiments of Mining in the Common Schools," which appeared in the issue of *Coal Age*, Sept. 7, p. 363, Thomas Allen calls attention to the rapid decrease of American miners employed in our mines, today; and thinks this decrease could be arrested if more attention were given to teaching the rudiments of mining, especially in our common schools.

In my opinion, teaching the true rudiments of practical mining in the common schools of the country, would be difficult, expensive and in a large measure unprofitable. As a general thing, the teachers in our public schools know little or nothing about even the simplest rudiments of mining.

Some of the teachers might have a smattering of mining knowledge, just enough to make a huge failure if they undertook to teach the subject. In order to successfully teach mining, the teacher must have both technical training and practical experience in the mining of coal. The best place to study the rudiments of mining is at the face inside the mine, with an experienced and capable miner as instructor.

ACCIDENT LIST INCREASED BY LARGE EMPLOYMENT OF FOREIGNERS

Mr. Allen seems to think that the employment of so many irresponsible and illiterate foreign miners is the cause of the high accident list in our mines. In this respect, I think his view is correct. The employment of so great a proportion of foreign miners, is responsible, in a large measure, for the American boy leaving the mine. As the one comes in, the other will go out.

Digging coal should be considered as honorable a calling as that of a carpenter or machinist. But coal mining has been degraded more than either of these professions by the overwhelming influx of illiterate and undesirable foreign labor. In many mines, today, this irresponsible element of labor has the controlling power. It is nothing strange that such an ingrafting of foreigners into the mines and the results that naturally follow have caused young Americans to drift into other occupations. Our lads with their high American ideals of patriotism and respectability of association, as a standard of life, no longer find mining a congenial means of earning a livelihood and turn from it to seek employment in the shop or factory, though at less wages.

As coal mining has been conducted during the last few years, it has fallen into such disrepute as a profession that few fathers, if any, want their sons to become miners in following after them. Old miners can often be heard to say, I want to get my boy out of the mines and into something else. In the mine, he hears nothing but profanity and murmurings of discontent, from morning to night.

The truth of the matter is that there is no peace to be had, long at a time, under any circumstances in the mines. It is one strike or confusion after another. Miners have grown more unreasonable than formerly, regardless of wages received. High wages no longer make them the contented and loyal citizens that they once were.

In conclusion let me suggest that if labor organizations would change, in many instances, from a policy of "Rule or ruin," to one of business and common sense; and if operators would regard their employees as American citizens, entitled to the rights and privileges of all free men; and place a higher value on moral character and the welfare of the community; violence and strikes will pass into history. If the better element of our miners and operators will co-operate and establish a more friendly system or relationship toward each other, it will make mining more attractive as an occupation; and more of our young men will seek positions in the mines.

Dayton, Tenn. JOHN ROSE.

Inquiries Of General Interest

Estimating Available Tonnage Per Acre

Observed Difference in Estimated and Tabulated Tonnages—Tables Make No Allowance for Loss in Extraction

REFERRING to the question asked by a Colorado engineer, in *Coal Age*, Nov. 2, p. 721, in regard to the method of estimating the tonnage of coal underlying an acre of land, for a given thickness of seam, I observe that there is quite a difference between the results obtained by applying the rule given in the reply to that inquiry and the tonnage tables published on a "Lefax" sheet, issued some time ago.

The table to which I refer gives the estimated tonnage of coal, per acre, for each foot of thickness of the seam, and for any specific gravity varying from 1.2 to 1.65. For example, for a coal having a specific gravity of 1.2 and weighing $1.2 \times 62.5 = 75$ lb. per cu.ft., the table gives 1,633.5 short tons (2,000 lb.), for each foot of thickness of the seam. The data given in the table shows the tonnage varies with the specific gravity of the coal and the thickness of the seam.

On the other hand, the reply to the inquiry mentioned gives a rule based on an estimated weight of 1,200 tons of coal, per foot-acre. This rule is assumed to apply to coal of average specific gravity, for either anthracite or bituminous coal, the former being measured in long tons (2,240 lb.) and the latter in short tons (2,000 lb.).

Now, assuming an average specific gravity for bituminous coal of 1.33, the table gives the weight of this coal as 83.125 lb. per cu.ft.; and 1,810.46 short tons, per foot-acre. Or, taking the average specific gravity of anthracite coal as 1.5, the table gives the weight of this coal, per foot-acre as 2,041.87 short tons; or $2{,}041.87 \div 1.12 = 1{,}823$ long tons. These calculations show that the average estimated tonnage, as computed in the table, is based on, practically, 1,800 tons, per foot-acre, measuring the anthracite in long tons and bituminous coal in short tons.

Since this estimate is quite different from the 1,200 tons, per foot-acre, given in the reply to this inquiry, I have been wondering wherein the difference lies. Is this difference due to the table being computed on the weight of coal in the solid and making no allowance for the voids in the broken coal, as prepared for market? INQUIRER.

Philadelphia, Pa.

It should be observed that the reply to the inquiry referred to by this correspondent gives the approximate rule commonly used for estimating the available tonnage of coal underlying an acre when the seam is practically level. As he has stated, the rule gives 1,200 tons, per foot-acre, for anthracite and bituminous coal, respectively, the former being measured in long tons and the latter in short tons.

As then stated, this rule assumes an extraction of about 80 per cent of the original seam. It also makes a further allowance of about 16⅔ per cent for

screenings, thus applying to lump coal as prepared for the market.

For example, taking the tabulated value as, say 1,800 tons of average bituminous coal, per foot-acre, an 80 per cent extraction would yield 0.80 × 1,800 =, say, 1,440 tons of mine run coal. Then, allowing one-sixth, or 16⅔ per cent for screenings, leaves five-sixths of this amount as available lump coal; or, ⅚(1,440) = 1,200 tons.

The rule is only approximate and must be modified in accordance with the percentage of extraction in the seam and the manner of preparing the coal for market. It is a fairly safe rule for estimate, having in mind this explanation.

Examination Questions Answered

West Virginia Mine Foremen's and Firebosses' Examination, Charleston, 1922

(First-Class, Selected Questions)

QUESTION—*Assuming you have several sets of cross-timbers to take out, and on top of these timbers were several tons of loose rock and slate, explain what would be your method of taking out said timbers and what precautions you would take to insure safety to employees and prevent damage to property.*

ANSWER—The work should be started at the outby end, after a close examination and study of the conditions. The method of proceeding will depend on this examination. As far as practicable, the new timbers set should be put in position before attempting to remove the old ones. If the old timbers stand so close that new sets cannot be placed between them, it will be necessary to carefully take out a single set of the old timbers, replacing it at once with a new set. It will not always be possible to retimber such a place without removing a portion or all of the loose material.

QUESTION—*If powder smoke requires 2 min. 17 sec. to travel 149⅓ yd., in an airway 6 x 12 ft. in section, what volume of air is passing?*

ANSWER—Two minutes and seventeen seconds is 137 sec. and a distance of 149⅓ yd. is 448 ft. Then, since the sectional area of this airway is 6 × 12 = 72 sq.ft., the volume of air passing is 72 × 60(448 ÷ 137) = 14,132+ cu.ft. per min.

QUESTION—(*a*) *No gas being generated, would you consider the condition dangerous if it is dry and dusty at the working face?* (*b*) *What precautions would you take in the blasting of coal where you had a condition of this kind?*

ANSWER—(a) A dry and dusty condition at the working face in a mine is always dangerous, whether or not gas is generated. This is particularly true where blasting operations are performed.

(b) When the coal is blasted under the conditions named, only permissible powder should be employed and every shot should be examined by a competent person before it is fired. Safer practice is to employ shotfirers to examine, charge, and fire all shots in the mine, after the men have gone home. It is particularly important to remove all coal cuttings and dust regularly from the working faces. Every working place should be thoroughly sprinkled and in a moist condition before a shot is fired therein.

QUESTION—*How would you render first-aid to* (*a*) *a victim of asphyxiation from afterdamp; and* (*b*) *one suffering from powder burns on neck and back?*

ANSWER—(a) Remove the person as quickly as possible to better air and perform artificial respiration, using the prone method and laying the victim outstretched on his stomach, with his face turned slightly to one side, so as not to obstruct breathing. Also, see that the tongue is drawn forward in the mouth, for the same purpose. Kneeling astraddle of the man, place the two hands or outstretched palms over the small of the victim's back, so as to cover the lower ribs. Then, alternately, compress the body and lungs to expel the gas therefrom, and again relieve the pressure so as to give opportunity for the lungs to expand and draw in fresh air. This action should alternate at about the rate of breathing, say sixteen times a minute, and should be kept up continuously until the victim revives, which may require an hour or more. Never cease until the man revives or is pronounced dead by a doctor. In every case, no time should be lost in sending for a physician.

(b) If the burns are severe, send for a doctor at once. In the meantime, having loosened the clothing or cut it so as to lay it back from the burned portion of the neck and back, exclude the air by applying a thin paste of bicarbonate of soda (baking soda) and water. Starch or flour can be used if the baking soda is not at hand. Vaseline, olive or castor oil, fresh lard or cream, are all good for this purpose. They should be smeared gently over the burned portion and on a thin fine cloth, which should then be laid over the burn so as to exclude the air as much as possible.

QUESTION—(*a*) *How would you approach the burning section of a mine if you found the condition necessitated the sealing off of the burning section?* (*b*) *What steps would you take to insure safety of the workers and the success of their work?*

ANSWER—(a) Much will depend on the conditions existing in the place, the location of the fire with respect to the openings in that section, and the headway the fire has gained. In most cases, greater safety is assured by starting to build the first stoppings at the return end of the section and proceeding in order from that point to the intake end, closing that stopping last. There are two advantages claimed for this method of proceeding. 1. By closing the return opening first, there is at once started an accumulation of burnt air and extinctive gases produced by the fire. This has the effect of retarding the combustion. 2. The intake opening remaining unsealed while closing the return end, more or less air will drift into the space through this opening and help to dilute the explosive mixtures that would otherwise be formed. Where the fire has gained much headway, however, it may often be better to close the intake opening first, so as to cut off the air from the fire. At other times, the stoppings are built up near to the roof and both the intake and return ends closed simultaneously.

(b) To insure safety, none but the most experienced men should be employed and they should be equipped with approved types of safety lamps. Frequent tests of the air at the openings must be made and every precaution taken to avoid the worker being overcome by the gases.

QUESTION—*In case of an accident, in which a workman receives a wound severing an artery, what would you do to prevent hemorrhage and take care of him until the arrival of a physician?*

ANSWER—Send for a physician at once. In the meantime check the bleeding, by strong pressure of the thumb or fingers over the artery, near to the wound and between it and the heart. Still holding the severed artery in this manner, arrange the injured person in a reclining position with his head low to encourage the flow of blood to the brain and prevent collapse. Make no violent movement but keep the man quiet, as any unnecessary movement will tend to increase the flow of blood from the wound. As quickly as possible arrange a bandage with a hard pad beneath it to press on the severed artery. Now apply a tourniquet and twist the bandage sufficiently to bring a strong pressure on the wound. The bandage must not be removed for, say two hours, or before the arrival of a physician. Give no stimulant, except when absolutely necessary to prevent collapse and possible death. Keep the patient warm with blankets and hot-water bottles if these are obtainable.

Wage Plan Fails, So Joint Conference in Chicago Jan. 3 Has No Program for Avoiding Strike

The long effort at Chicago to devise a method for future wage negotiations in the coal industry failed signally. The miners of the "two-by-two committee" rejected the operators' plan calling for negotiations by districts either singly or in such groups as chose to form, for arbitration and for sliding wage scales conforming to coal market prices. So nothing much remained to be done. The committee, composed of two operators and two miners from each of 15 districts, then voted that the main wage conference should be held in Chicago instead of Cleveland, Jan. 3, and that the committee should meet an hour before the main session in a last-minute effort to make some sort of helpful report to the big assemblage. Nobody expects anything to develop at this last-gasp meeting. Thus the main conference is expected to remain at deadlock unless some new element shall be injected into the situation before Jan. 3.

The "two-by-two committee" was appointed at the October joint conference in Cleveland, when that main session failed to agree upon a wage-making method. It was directed to convene in Chicago Nov. 14 and try to do around a table what the big joint meeting had failed to do in a smoke-filled ballroom. It tried for four days, beginning Nov. 14, and failed. It tried again last week, the operators' half of the committee striving for two days and finally framing a proposal they could agree upon. When the miners in the joint session of the committee Dec. 6 would have none of it, the committee quit in despair. The Jan. 3 main conference is supposed to begin actual wage negotiations, but it is freely prophesied that the struggle is going to be a troublous one and that any kind of agreement by April 1 to prevent a strike will be difficult.

Committee's Final Session of Short Duration

The final session of the "two-by-two committee" Dec. 6 was a short one. When the operators read their proposal to the miners at 11 in the morning there was an immediate howl of disapproval from union men. Both President Lewis and Secretary Green, of the union organization, declared peace ought to be established in the industry, but they followed this by making it plain that the miners would stand for nothing less than the setting up again of the old four-state plan of negotiations with a flat scale for the whole country and with nothing even faintly resembling arbitration. The operators quickly agreed to eliminate the sliding wage-scale provision but stuck solidly to the clauses for negotiations by districts either singly or in groups (without specifying what the groups should be) and for arbitration of wage questions by either a non-partisan or combination jury.

In the afternoon session there was a great deal of more or less aimless oratory but no definite accomplishment until about 5 o'clock, when the operators' proposal was put to a vote and lost, each side voting as a unit. Then the miners' proposal that the old four-state plan be continued lost with equal ease. The committee had failed. John Brophy, of the miners, was the man who suggested that the committee reconvene just before the joint conference Jan. 3. The motion was adopted, but without any display of enthusiasm.

The committee took into its own hands the question of changing the Jan. 3 conference from Cleveland to Chicago. On this question every man present voted as an individual and Chicago was selected by a narrow margin of three votes.

The proposal for wage negotiations which the operators agreed upon and which the miners rejected, but which no doubt will be brought up in the Jan. 3 conference as written by an operators' resolutions committee, follows:

"(1) The uniform and inflexible policy pursued by the United Mine Workers of America in the past of fixing a basic wage scale in one district grouping of a limited number of states producing a minority portion of the bituminous tonnage of the country, and by the centralization of power enforcing said wage scale upon all other districts of the country without regard to the competitive conditions affecting the other said districts, is rapidly destroying the business of the operators in many union fields and is the chief contributing cause of overdevelopment of the industry.

"There are indictments for conspiracy now pending in the federal court of the district of Indiana against representatives of the mine workers and representatives of the operators who have formerly participated in the negotiation of wage agreements for the Central Competitive Field (Ohio, Illinois, Indiana and western Pennsylvania) which make it imperative that a new method of negotiating wage agreements be formulated. Therefore, we recommend:

"(a) That each of the United Mine Workers districts jointly represented in this conference be constituted a wage-scale-making body with full right of autonomy to negotiate wage-scale agreements based upon competitive conditions found existing and affecting each such district and, further, each such district shall be vested with the right to join with any other district or districts as may be mutually satisfactory to the mine workers and the operators of the district or districts affected, for the purpose of negotiating wage agreements for such section.

Provides for Joint Conference of Districts

"For the purpose of negotiating wage-scale agreements to be effective upon the expiration of the present wage agreement namely, April 1, 1923, the following named districts: District No. 2, central Pennsylvania; District No. 5, western Pennsylvania; District No. 6, Ohio; District No. 10, Washington; District No. 11, Indiana; District No. 12, Illinois; District No. 13, Iowa; District No. 14, Kansas; District No. 17, West Virginia; District No. 21, Oklahoma, Arkansas and Texas; District No. 22, Wyoming; District No. 23, western Kentucky; District No. 24, Michigan; District No. 25, Missouri, and District No. 27, Montana, shall exercise their inherent right under this resolution and by mutual agreement between the mine workers and operators of each of the districts or sections hereinbefore mentioned shall meet in joint conference at such place as the operators and miners of each district or section may agree; such meetings shall convene in all districts on Jan. 8, 1923, for the purpose of negotiating wage-scale agreements. The action of any wage-scale-making district or section shall be binding only on that district or section and shall not be binding or have any effect whatsoever upon the making of a wage-scale agreement in any other district or section.

"(b) Further, in the interests of public policy and in order that there shall be guaranteed continuing fuel supply and entire prevention of strikes, there shall be no suspension of work during the period either of negotiation or such arbitration either in the district or section, we recommend that in the event of failure of joint wage-scale committee of any district or section to reach a satisfactory wage-scale agreement, the points in dispute shall be submitted to a neutral board of arbitration composed of three members of recognized ability and high public standing, to be appointed by the President of the United States, and neither of whom shall have any connection either direct or indirect with the coal industry, or a board of arbitration consisting of one representative of the mine workers and one representative of the operators and a third member, neither a miner, an operator nor interested in the coal industry directly or indirectly, be appointed by the federal judge of the district where such arbitration is to be held. The decision of such board of arbitration on any point of dispute to them referred shall be final and binding upon both sides.

"(c) Further, we recommend that each district or section agreement negotiated shall carry a clause providing for a flexible wage scale which shall permit, when competitive circumstances shall demand, an adjustment of wage scale that will allow of free competition between all districts."

All Set for Herrin Trial to Start Dec. 13

The tedious job of choosing twelve good men and true to try the small host of men charged with murdering and conspiring to murder twenty-one non-union coal miners and guards at the Lester strip mine near Herrin, Ill., last June is completed. The twelve are more than half miners. Members of the United Mine Workers of America, which is defending the prisoners, have been paying part of their earnings into a special union assessment checked off supposedly for the defence fund. These jurors, however, have all sworn they are disinterested and without prejudice and can vote a death penalty if that seems just. The state used lavishly of its peremptory challenges to keep union veniremen off the jury, but it could not be continued forever. Most men drawn for each venire were union miners because the county is so solidly unionized.

Judge D. T. Hartwell has issued a warning against any sort of demonstrations in the court room during the impending trial, which was scheduled to start Wednesday, Dec. 13, with the opening statements of the attorneys. "No testimony will be laughed at," says his statement. "No expressions of approval or disapproval will be allowed. If anyone in the audience makes such expressions before the jury I will send that person to jail." Thus the stage is set for the trial.

Keeney Murder Trial to Begin in January Before Judge Woods in Morgan County

Trial of C. Frank Keeney, president of district 17, United Mine Workers of America, on the charge of being a murder accessory, such a charge growing out of the armed march of last year, will begin soon after Jan. 1. Keeney's trial is to be in Morgan County under a second change of venue granted by Judge J. M. Woods. Morgan County is in Judge Woods' circuit, so that Keeney's trial will be under Judge Woods' direction just as all the other trials growing out of the armed march have been. Morgan County was selected by Judge Woods as the county for the trial after attorneys for the state and for the defense had failed to reach an agreement, as there is no coal mined in Morgan and because Judge Woods felt that it was not involved in the industrial controversy. Court will be convened at Berkeley Springs, Jan. 2.

Accidents in October Killed 186 Miners, 3.46 Per Million Tons Produced

Accidents at coal mines in October caused the death of 186 men, according to reports from state mine inspectors to the U. S. Bureau of Mines. Twenty-five of the fatalities were at anthracite mines in Pennsylvania and 161 at bituminous mines in all states. In October a year ago 180 miners were killed, including 42 at anthracite mines and 138 at bituminous mines. The death rate for October, 1922, was 3.46 per million tons of coal produced; a year ago the October rate was 3.43. During September, last, there were 153 fatalities, or 3.31 per million tons produced.

The average fatality rate for October during the past nine years (1913-1921) is 4.27 per million tons of coal mined, and the average number of lives lost during the same period is 238. It will thus be noted that the October, 1922, rate is much below the average rate for October for the nine-year period.

The loss of 186 lives in October, 1922, has brought the total number of deaths at coal mines during the first ten months of the present year to 1,378, as compared with 1,665 during the corresponding period of 1921. By a strange coincidence the fatality rates for the two periods are identical, 3.92 per million tons. The output of coal this year has reached 352,000,000 tons, while during the ten-month period last year the production was 425,000,000 tons.

Accidents due to causes other than explosions show no material change in frequency from those that occurred last year, except in the case of deaths due to the use of powder and other explosives, for which the rate has declined from 0.315 to 0.187 per million tons.

COAL-MINE FATALITIES DURING OCTOBER, 1922, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total	1922	1921
Alabama	5		4	1									10													10	3
Alaska																										0	0
Arkansas		1											1													1	1
Colorado																										0	5
Illinois	7		3			1						1	12										1		1	13	17
Indiana	3		3										6													6	5
Iowa		1											1													1	2
Kansas	1												1													1	0
Kentucky	7					1				1			9											1	1	10	13
Maryland		1											1													1	2
Michigan																										0	0
Missouri	1												1													1	1
Montana	1												1													1	0
New Mexico		1											1													1	1
North Dakota						1							1													1	0
Ohio	10		2			1		3					16				2	2								18	12
Oklahoma	1												10													10	5
Pennsylvania (bituminous)	9	7	10			1		2					29			2		2						2	2	33	33
South Dakota																										0	0
Tennessee	1	2											3													3	0
Texas								1					1													1	0
Utah	2		1										3						1						1	4	1
Virginia	2												2													2	0
Washington						1							1													1	0
West Virginia	18	3	8			2		3		1			35						1					3	4	39	32
Wyoming	3												3													3	5
Total (bituminous)	71	16	31	9	1	8		9		2		1	148			2	2	4	2				1	6	9	161	138
Pennsylvania (anthracite)	7	7	3			4		1				1	23											2	2	25	42
Total, October, 1922	78	23	34	9	1	12		10		2		2	171			2	2	4	2				1	8	11	186	
Total, October, 1921	97	4	34	3	4	10	1	10		1	1	5	170		1	1		2	1	1	1		2	3	8		180

Is Strike Unavoidable? Western Operators Look Into Future as Through a Blue Glass Darkly

Is there bound to be a strike of union coal miners April 1?

Midwestern opinion among coal operators tends to follow one channel on this question. Only two things can prevent a strike—assuming that union bullheadedness continues—and each of them is rather indefinite. Either some unexpected factor enters the situation from the outside or some few operators with clouded vision and limber spines sign on the union's dotted line. Neither is confidently expected.

About the only source of a possible new factor is the Federal Coal Commission, and operators recognize that the commission is neither empowered nor expected to take a hand in the wage battle. It might possibly make some helpful suggestions in an early report to Congress; that's all. If these do not influence miners to recede from their stand for a continuation of the present wage scale and negotiation by regions at least as large as the four-state field, or if they do not make it somehow seem advisable for the operators to swallow the union's dose, then there is little hope of avoiding another coal crisis.

"I seriously can't decide which would be worse for the operators and the industry, a strike or a new agreement on the present wage scale," said an official of a company operating more than a score of mines. "A strike would mean a definite shutdown for all union mines while a settlement on union terms—which seem about the only terms that can be made without war—would keep coal so high in a season of probable poor demand that most mines, unable to dig coal cheaply enough to sell it, would either be closed all the time or would operate on such a hit-and-miss basis that the whole business would be continually at sixes and sevens. As between the two I don't know but that a strike would be preferable."

Thinks Fight to Finish Might Not Be Unmixed Evil

Another important Western operator frankly declared: "Six months of undiluted hell in a strike might be the very best thing for the whole industry. In the first place I don't think the union could weather it by any means as well as it did the last strike, and in the second place such an occurrence would give the Federal Fact-Finding Commission the best possible opportunity to see the evils of the industry come to a head. Such an unhappy event as a strike would focus the attention of the country, official and unofficial, on coal, so that really the situation would be of benefit to the commission in its effort to suggest remedies for the industry's ills. Nothing could then keep the commission's recommendations from getting full and undivided attention in Congress and elsewhere."

There is a general wish by operators everywhere that the commission do something soon that may clear the air at least a little. If it were to induce the Attorney General to define the government's position regarding four-state or other group agreements between operators and miners, it would have accomplished something for the direct benefit of everybody interested in coal, including the public, many men believe. This, of course, would have to be done within the next two or three months to be effective. But even this would not be conclusive. The Attorney General might express an opinion about the legality of group agreements which would bind nobody in case a new Attorney General were to succeed Mr. Daugherty. It would be far more beneficial if pressure could be brought to bear upon the federal court at Indianapolis to try at once the case against the 225 miners and operators long ago indicted for conspiring in four-state negotiations to restrict production and keep the price of coal up.

The failure of the miners and operators in special joint committee at Chicago to agree upon a method of future negotiations causes no unhappiness among Midwest operators. Since the miners would agree to nothing short of a resurrection of the four-state plan whose legal status is still so much in doubt, and since there is always a chance that the situation will take a new turn before April 1, when the present agreement runs out, it is considered advisable that no plan whatever be adopted for the time being.

"My idea of what to do," says an operator who has been playing a leading part in every recent labor struggle. is this: "On Jan. 3 if it still seems impossible for the operators to agree upon any plan acceptable to the miners, let's then go into session with the miners in the old four-state group. That will be better than to quit cold and it will not necessarily mean any settlement. We can chew the rag with Lewis until the very last cow comes home, offering him every reasonable plan which would allow the coal industry to work—a thing it simply can't do next summer at present wages—and then, if nothing crops up from the outside, why the strike will have to come, that's all. We'll fight it out about as usual, probably losing out in the end, but at a cost to the miners that they can hardly stand."

It is the general opinion in the coal trade that the union would have a harder row to hoe in a strike next summer because of the unlikelihood of a companion rail strike to aid it. Also it is generally believed that next time the government will not adopt the same attitude it took last summer.

Mining company officials with long experience are beginning to advise their superintendents to prepare to store coal wherever possible about the mining properties, and already storage arrangements are being made against a shutdown. Naturally industries are going to do a good deal of storing as the winter wears along unless a settlement appears more likely than it does now, and possibly the storage piles of the country next April 1 will be stupendous.

Illinois Operators Agree Not to Ask More Than $4.50 at Mine for Domestic Coal

Prices on domestic coals produced in southern Illinois have been adjusted by a number of operators. as shown in the following statement, issued Dec. 8 by Federal Fuel Distributor C. E. Spens:

"The following named coal operators in the Fifth and Ninth districts of Illinois have individually signified to the Federal Fuel Distributor a willingness not to exceed $4.50 per ton as a maximum f.o.b. price at the mines on prepared sizes of coal for household use, and in most instances these operators have stated that this maximum will be observed at least until April 1, 1923:

Southern Coal, Coke & Mining Co., St. Louis, Mo.
Breese Trenton Mining Co., St. Louis, Mo.
Mount Olive & Staunton Coal Co., St. Louis, Mo.
Prairie Coal Co., St. Louis, Mo.
St. Louis & O'Fallon Coal Co., St. Louis, Mo.
Groom Coal Co., Belleville, Ill.
Egyptian Coal & Mining Co., St. Louis, Mo.
Abbey Coal Corporation, Collinsville, Ill.
Jones Bros. Coal & Mining Co., Marissa, Ill.
Mulberry Hill Coal Co., Freeburg, Ill.
Kolb Coal Co., St. Louis, Mo.
General Coal & Mining Co., Freeburg, Ill.
Eldnar Coal Co., Belleville, Ill.
Fullerton Coal Co., Belleville, Ill.
Donk Bros. Coal & Coke Co., St. Louis, Mo.

"These operators represent approximately 60 per cent of the production in these districts. Some of the best grades of domestic coal in these districts have been selling for as high as $5.50 per ton, and some have been selling, and are today selling, for less than $4.50 per ton. The maximum price of $4.50 should tend to establish prices on the different grades of domestic coal on a proper commercial level."

The various drafts of codes for mine rating and car distribution rules which have been laid before the Interstate Commerce Commission were discussed at a meeting of the railroad relations committee of the National Coal Association held in Washington, Dec. 11. The whole subject of rating and rules was discussed and the committee has under consideration supplemental suggestions which will be submitted to the Commission.

Wholesalers in Informal Conference with U. S. Coal Commission

Seth W. Morton, of Albany, N. Y., president of the American Wholesale Coal Association, and Noah H. Swayne, 2nd, of Philadelphia, held an informal conference with the United States Coal Commission Tuesday afternoon, Dec. 5. The scope of the wholesale coal business was described to the commission and the service performed by the wholesaler was discussed. The supplying of business credit to the small coal mines on the one side and to the smaller industrial consumer on the other was stated as a necessary function and an estimate of $90,000,000 was given as the total commercial ratings of members of the association. Fuel engineering also was mentioned as a part of the service rendered to the coal consumer by the wholesaler, who in these days seeks to sell service along with the coal.

At this preliminary conference President Morton promised to submit through a formal statement to the Coal Commission suggestions on the points which have been discussed by representatives of the other branches of the coal trade. The executive committee of the association will convene at Washington, on Thursday, Dec. 14, and on Dec. 15 will meet the commission and submit in detail their observations, suggestions and recommendations.

H. J. German to Serve Fact Finders In Advisory Capacity

Arrangements have been perfected whereby H. J. German, vice-president of the Montour R.R., will serve the President's coal commission in an advisory capacity. In rounding out his technical staff, C. E. Lesher, who is in immediate charge of the engineering phases of the commission's investigations, found that he must have the help of a practical man experienced in moving coal.

Mr. German was reared, practically speaking, on the Chicago, Burlington & Quincy R.R. He also has had Western transportation experience in Colorado. He was in charge of the open-top car pool for the Railroad Administration from late in 1917 until September of 1919. In the latter month he was called upon by the Railroad Administration to direct the handling of coal during the big strike and during the emergency period which followed it. The success which followed his efforts at that time has caused him to be regarded as one of the best coal transportation specialists in the country.

Navy Asks Bids for 139,600 Tons of Coal For Navy Yards and Naval Stations

The navy has called for bids for 139,600 tons of bituminous or semibituminous run-of-mine coal for navy yards and naval stations. Tenders on sixteen classes are called for, among the principal items being the following: 25,000 tons for the Brooklyn Navy Yard; 5,400 tons, navy supply depot, South Brooklyn; 8,500 tons, naval air station, Lakehurst, N. J.; 25,500 tons, navy yard, Washington, D. C.; 10,500 tons, White Plains, Md.; 13,800 tons, Naval Academy, Annapolis, Md.; 14,000 tons, navy yard, Norfolk, Va.; 17,900 tons, naval operating base, Sewalls Point, Va.; 3,400 tons, Naval Hospital, Norfolk, Va.; 4,000 tons, navy yard, Charleston, S. C. The bids are to be opened Dec. 19.

Coal Commission Finds Bituminous Coal Industry Overdeveloped 30-60 Per Cent

Studies already made by the U. S. Coal Commission all point to the fact that the bituminous coal mining industry is overdeveloped. "Too many soft coal mines and too many miners" describes the situation in plain English. In these coal mines more capital is invested and more miners are employed than are needed to produce the coal the country requires. This condition, of course, involves waste on a countrywide scale.

How great is the present inflation of the industry cannot be stated exactly at this time, but unquestionably the inflation is excessive. Estimates of the excess mine capacity range from 30 to fully 60 per cent above the country's normal demand, which for the last five years has averaged about 510 million tons a year.

How to deflate the coal industry is one of many problems before President Harding's coal commission, and its reports may be expected to present facts bearing on this question. It seems plain enough, however, that the industry should not be further inflated by opening new mines.

J. W. Adams Probes Wholesale and Retail Distribution for Coal Commission

J. W. Adams, who is making studies of wholesale and retail distribution for the President's coal commission, is widely known in the coal industry as a result of having traveled extensively as a field agent for the Federal Fuel Administration during the war. During that period he

J. W. ADAMS

also served as director of prices for the Illinois Fuel Administration.

Mr. Adams is a native of Whiteside County, Illinois. His higher education was obtained at the Geneseo Collegiate Institute at Geneseo and at Northwestern University. Immediately after being graduated from the latter institution he joined the technical staff of the Federal Trade Commission, where he served until the outbreak of the war. When the war-time Fuel Administration was dissolved Mr. Adams returned to the Federal Trade Commission, where he has served as an economic examiner since.

Only Two Bids Submitted for Navy Coal

Only two bids were received in connection with the tenders requested on Dec. 6 by the Navy Department for fuel supplies for New York harbor, the Brooklyn Navy Yard and for the Navy Yard at Philadelphia. The Iron Trade Products Co., of Pittsburgh, offered to furnish 12,000 tons for railroad delivery Dec. 15 to Jan. 31 at $6.51 per ton and 6,000 tons for barge delivery during the same period at $5.95 per ton.

The Morrisdale Coal Co., of Philadelphia, made a tender of $7.35 per ton for 12,500 tons for barge delivery, Dec. 15 to Jan. 31. On another lot of 6,500 tons a price of $7.30 was quoted.

The Navy had called for bids on 15,000 tons of steaming coal for delivery f.o.b. at New York harbor and the Brooklyn Navy Yard, and 4,000 tons for delivery under the chutes at piers Philadelphia and 200,000 tons for delivery at Hampton Roads. An additional 18,000 tons of run-of-mine was requested for delivery at Philadelphia.

No Mediation of Wage-Scale Disputes Will Be Undertaken by U. S. Coal Commission

By Paul Wooton
Washington Correspondent of *Coal Age*

No fact finding which can be interpreted as mediating or arbitrating wage-scale disputes will be undertaken by the President's Coal Commission. This point was made emphatically clear by John Hays Hammond, chairman of the commission, in announcing that John L. Lewis and representatives of the mine workers and certain mine operators had been requested to confer with the commission.

Mr. Hammond declared that the commission is much concerned because of the failure of the Chicago conference to adopt machinery to negotiate wage scales for the coming coal year. He stated that the commission is fully alive to the gravity of the situation and that it had asked representative men on each side to confer with the commission. He pointed out that the conference is to be an informal heart-to-heart talk, in which the members of the commission will urge each party to the controversy to get together. Mr. Hammond declared, however, that the commission will acquaint itself thoroughly with the facts surrounding wage-scale matters.

One company, it is reported, made a detailed return on the cost questionnaire on the fifth day following the despatch of the questionnaire from Washington.

Chairman Hammond revealed that it is the intention of the commission to conduct formal public hearings on the important controverted issues during February. At these hearings arguments for and against nationalization of the coal mines, among other things, will be taken up. On the completion of those hearings, the commission expects to visit the mines.

As representatives of the operators, the mine workers, wholesalers, retailers and the carriers confer with the commission, each is being asked what he would do were he in the commission's place.

Will Gather Only Statistics Submitted Under Oath

Rather than take the chance of having its work discredited by having its figures questioned, the President's coal commission will insist on gathering statistics from individual operators, who make the return under oath. The members of the commission realize that their fact-finding activities would be simplified greatly were they to accept the figures of the various local associations. Were they to rely on these figures alone, it is feared that some members of Congress would make an issue of that point and thereby bring discredit upon many of the commission's findings. The commission apparently feels that it must be 100 per cent sure of its basic facts and must not leave itself open to destructive criticism regardless of how reliable the members of the commission may regard the figures of the local associations.

There were extended discussions between members of the commission and the bituminous operators' special committee, of which J. C. Brydon is chairman. These meetings consumed the greater part of two days, Dec. 6 and 7. The committee was assisted in its presentation by John W. Davis and Goldthwaite H. Dorr, of counsel.

The main object of the committee's visit to the commission was to obtain further information in regard to the cost and labor questionnaires. The conferences, however, were not confined to a discussion of cost and labor returns. Consideration was given to a wide range of coal-mining questions.

The operators' committee contended that there should be simplification and clarification of these forms, but the commission rather was of the opinion that the data called for are necessary to an intelligent consideration of the subject and that the instructions on the forms are ample. It is possible that some changes will be ordered in the labor form going to non-union operators.

After the conferences the operators' committee sent out a statement to the members of the National Coal Association asking all operators to fill out these forms to the best of their ability and forward them promptly to the commission.

As a result of these conferences it is believed that the operators are more convinced than ever that the commission is making an earnest and intelligent effort to be of help to the coal industry. The desire to co-operate constructively in that effort is even stronger since this meeting. The committee very evidently is doing all that it can to convince coal operators generally that it has faith in the commission.

There is no disguising the fact that the commission is not well impressed with the operators' policy of employing expensive attorneys to assist them in the presentation of their cases. Mr. Davis has been Ambassador to England and Solicitor General of the Department of Justice. Were the commission considering certain international matters it would be willing to admit no doubt that Mr. Davis could enlighten it, but the issue presented at the time he made his brief statement for the coal operators was how best to determine the number of days an operative works in a mine. It is believed the commission would have been more interested in hearing from some of the accountants working in the offices of the operators than from such a distinguished legal light.

More Legal Notables to Be Heard

Apparently the commission is to hear further from distinguished counsel, as there is a rumor that the operators are about to engage former Secretary of War Stimson to assist them in their work with the coal commission. It is known that the commission is wondering why it is necessary to pay an attorney a single fee which is more than double the aggregate of the annual salaries of the members of the commission, when any one of a dozen operators who appeared before them last week is in a position to be of greater help in furnishing information which would enlighten the commission. The question naturally has arisen as to whether or not these large legal expenses form a proper item to add to the cost of coal.

The operators who participated in the conference with the commission were J. C. Brydon, T. W. Guthrie, S. H. Robbins, T. B. Davis, F. W. Wilshire, S. L. Yerkes, J. D. Francis, T. M. Farrell and J. D. Ord.

It was stated at the commission that much valuable information had been received from the representatives of the wholesalers who appeared before them last week. One of the points which appears to have impressed the commission very strongly is the fact that the wholesaler performs an important function in financing small operators and in extending credit to retailers.

The document submitted by the retailers is being studied. The fact that they emphasized their government fuel yard hobby has raised the question among the commissioners as to whether or not the proposal of the retailers to give the government a preferred price would not entail the same evil as grows out of lower prices on railroad fuel, which shifts more of the cost onto other consumers.

Washington, D. C., Dec. 11—Subpœnas were issued today by the President's Coal Commission to obtain testimony from several retail coal dealers as to the current price of anthracite. The hearing will be open to the press.

Check Off $4 by Dec. 15 or Indiana Strikes

Chicago, Dec. 11.—Unless the operators of Indiana agree by the night of Dec. 15 to check off a total of $4 from each mine worker's earnings for national union dues additional for November and December the whole state will be struck. John Hessler, president of District 11, delivered this ultimatum to the operators on Saturday, Dec. 9, after a week of wrangling with them over the legality of the addition under the terms of the contract. At first the operators refused to agree to it in a meeting Dec. 4. Since then their sentiment is said to have softened. The decision was scheduled to be made at the quarterly meeting of the Indiana Bituminous Coal Operators' Association on Wednesday, Dec. 13. Some operators made the November additional check-off, asserting that they didn't understand it because of evasive union explanations.

One proposal made to the operators' quarterly meeting was that Judge Anderson's District Court at Indianapolis, where 225 operators and miners were indicted for conspiracy partly because of the check-off, be now petitioned to enjoin the union from striking to enforce the check-off. This might draw from Judge Anderson some sort of decision as to the legality of the check-off. Those operators who went into the meeting weakening in the face of the union's demands contended that the legality of refusing the $4 for national dues was doubtful and that the question at issue is only a technicality not worth a strike.

The difficulty arose when it was learned late in November that the increases in the check-offs made at the mid-month pay included $2 for the national. It had not been explained to the operators that this special and temporary addition to the check-off was for that purpose, hence many of them paid without question. In cases where questions arose over the size of it, various answers were returned by the secretary-treasurers of the locals and the increases in most cases were spread over several items such as funeral expenses, initiation fees and the like.

On Nov. 28 Secretary Penna, of the operators' association, sent out a letter advising such operators as had been paying the swollen check-off to quit doing it, as it was in violation of the terms of the contract. He suggested that operators should not violate the contract if they expected the union to stand by it. On Monday, Dec. 4, an operators' meeting was held in Terre Haute at which the more or less complicated question of the justice of the thing was threshed out. The first vote on refusing to make the check-off was passed 35 to 15, 5 not voting; then it was made unanimous.

The contention was that President Hessler of District 11 had called the two-month increase a "special assessment" and therefore it could not be called "dues" collectable under the check-off clause of the agreement, which reads: "The operators shall offer no objection to the check-off for the checkweighman and for dues to the U.M.W. of A. provided that no check-off shall be made against any person until he shall have first given his consent in writing to his employer."

Mr. Hessler said in Chicago afterward that the "special assessment" was strictly union dues and therefore legitimate under the contract and that such mines as did not check it off at the mid-month pay would be struck and the rest would suffer at the last-month pay, Dec. 23.

Supreme Court Annuls Kohler Cave-in Law

Washington, D. C., Dec. 11.—The United States Supreme Court handed down a decision today declaring the Pennsylvania subsidence law unconstitutional. This law, the Kohler Act, was commonly known as the "cave-in" law, inasmuch as its avowed object was to prevent the mining of anthracite under cities or other property which might be endangered by sinkage. The opinion was read by Justice Holmes. A dissenting opinion was filed by Justice Brandeis.

The case at issue was styled Pennsylvania Coal Co., plaintiff in error, versus H. J. Mahon and Margaret Craig Mahon. The Attorney General of Pennsylvania and the City of Scranton intervened as interested parties. In this particular case one house was involved. The coal company showed that a deed to the property had been executed in 1878 conveying the surface but in expressed terms reserving the right to remove all the coal under it. The Court of Common Pleas held that the Kohler Act if applied to the case at issue would be invalid. The Pennsylvania Supreme Court agreed that the coal company had contract and property rights protected by the federal Constitution, but held that the state law was a legitimate exercise of police powers of the state and directed a decree for the owners of the surface. The coal company appealed by writ of error.

Commerce Commission Rescinds Open-Top Restrictions and Priorities

All restrictions on the use of open-top cars have been removed by the Interstate Commerce Commission and all priority of movement of certain commodities has been cancelled as of Dec. 11. This action was taken Dec. 8, when the commission issued amendment No. 4 to Service Order No. 5 and amendment No. 2 to Service Order No. 24.

Service Order No. 22 is the only general service order still outstanding. This order directs all common carriers to forward traffic to destination by the routes best calculated to expedite its movement and to relieve congestion. There are a few orders outstanding dealing with the placement of cars to meet individual and specific emergencies.

The amendments follow:

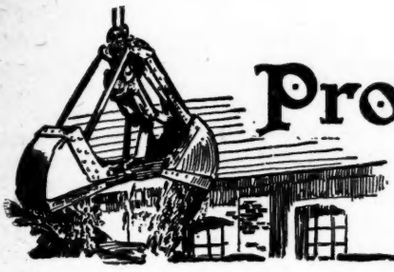
Amendment No. 2 to Service Order No. 24.—It appearing that the emergency which caused the commission on the 30th day of August, 1922, to make and enter its Service Order No. 24, and the amendment thereto made and entered on the 19th day of September, 1922, has been measurably relieved, it is ordered that said Service Order No. 24, as amended, be, and the same is hereby, vacated and set aside effective at midnight, Dec. 11, 1922.

Amendment No. 4 to Service Order No. 25.—It appearing that the emergency which caused the commission on the 19th day of September, 1922, to make and enter its Service Order No. 25, and the amendments thereto made and entered on the 17th of October, 18th of November and 23d of November, 1922, has been measurably relieved, it is ordered that said Service Order No. 25, as amended, be, and the same is hereby, vacated and set aside effective at midnight, Dec. 11, 1922.

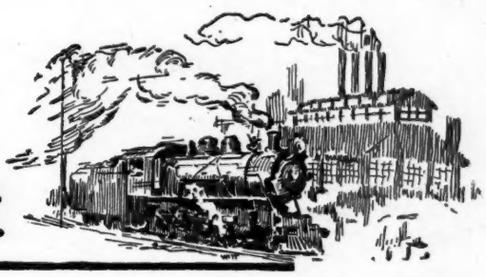
Amendment Penalizes Refusal to Answer Questions and Making False Returns

Washington, D. C., Dec. 11.—Representative Winslow of Massachusetts, chairman of the Committee on Interstate and Foreign Commerce of the House of Representatives, has introduced the amendment desired by the President's Coal Commission intended to remove all doubt as to the liabilities entailed by refusing to reply to questionnaires or for making false returns. The $5,000 fine and imprisonment for not more than one year is to apply not only to those who refuse to testify or who testify falsely but to those who refuse or neglect to answer any written questions propounded by the commission or any officer or agent thereof, "as herein provided for, and any person who shall wilfully give false testimony in respect of any matter or thing under investigation by the commission or shall make or cause to be made any false entry or statement of fact in any written answer or report called for by the commission or any officer or agent thereof, and any person who shall make or cause to be made any false entry or statement of fact in any book, account, record, document, correspondence, paper or other evidence, with intent to deceive the commission or any officer or agent thereof."

The amendment also provides that "judges of courts of the United States shall be eligible for appointment as members of the commission, and the appointment, qualification and service of a judge as member shall in no wise affect or impair his tenure as judge." This amendment is necessary to permit Judge Alschuler to qualify as a member of the commission. It provides that he is to receive his judicial salary while serving with the Coal Commission and that his traveling and per diem expenses may be paid by the Coal Commission.



Production and the Market



Weekly Review

Steam and domestic markets continue to see prices holding up well in the face of poor demand. The week opened with sagging prices on steam coals in every market save the North Atlantic region, where both high- and low-volatiles from Pennsylvania fields are holding their own and even exhibiting strength for the choice brands. Excepting only southern Illinois, the domestic lump prices are not sufficiently strong to sustain the generally weak steam demand and such fields as the Belleville, Hocking, Kanawha and Ohio No. 8 record price declines.

Difference in Markets a Complicating Factor

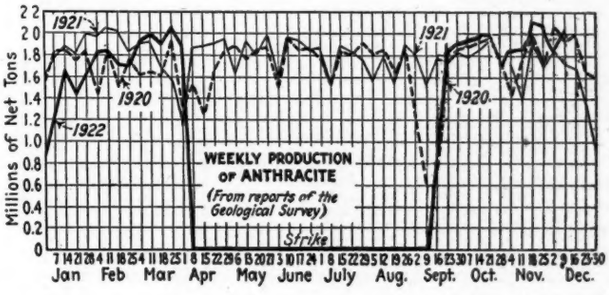
The smokeless situation is complicated by the difference in the markets East and West. The East will not pay more than $4.50 at the mines and the West is reaching for the same coal at prices up to $8. Difficulties in making deliveries westbound over both the Norfolk & Western and the Chesapeake & Ohio and the comparative amplitude of the supply at Tidewater account for this difference.

Production of bituminous coal is holding up around the 11,000,000-ton per week mark and although car supply continues to be the principal factor limiting production, lack of market is shutting down mines west of the Mississippi and limiting the running time of a number of small mines producing low-grade coal in the East.

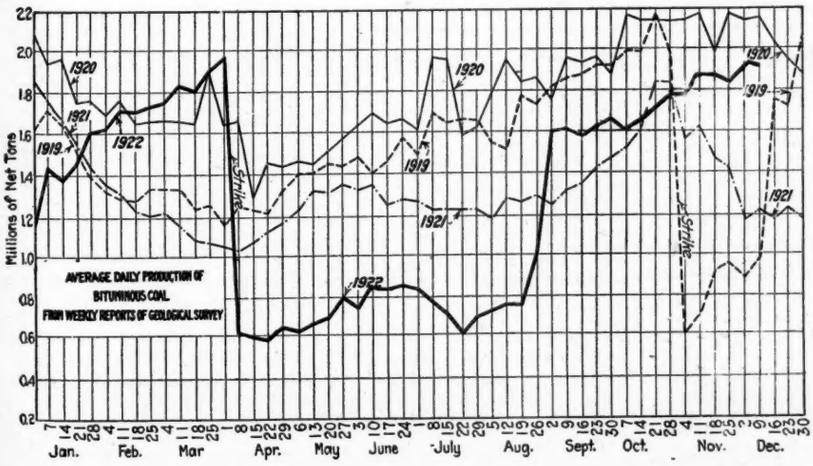
There is some stocking of soft coal by large consumers around Baltimore and by railroads in the Northern territory. Considering the country in general, however, there is little spot buying and what stocking is taking place is on contract. The East is feeling some stimulus from the purchases of retailers who are buying substitutes for anthracite. The New York State Fuel Administration now requires purchasers of domestic sizes of anthracite to accept 25 per cent of substitute fuel and forbids the sale of more than a month's supply of range and pea.

Several weeks ago it appeared that a large tonnage of soft coal might be left over at lower Lake ports. The last few days have seen a clean-up of these accumulations. It is expected now that there will be no holdover, the loading of 288,869 tons of Lake coal in the week ended Dec. 11 practically cleaning out the accumulations and setting a new record for the first week in December.

The production of anthracite is holding up at high levels, prices being limited only by the conscience of the seller and the fear of the authorities. Company prices are, of course, unchanged. Dealers in out-of-the-way places report they can obtain plenty of independent coal of desirable sizes at mine prices of $12@$14. Distribution is under the control of the anthracite operators with a central organization in Philadelphia, the policy of which is governed, of course, by the Federal Fuel Administrator in Washington.



Restoration of man power in the Connellsville region, which was hit by the strike last summer, has now progressed to the point where mine labor and car supply for coal and coke combined are in excess of the market demand.



Estimates of Production

(Net Tons)

BITUMINOUS

	1921	1922
Nov. 18 (*b*)	8,871,000	11,215,000
Nov. 25 (*b*)	7,101,000	11,100,000
Dec. 2 (*a*)	7,105,000	10,336,000
Daily average	1,184,000	1,972,000
Calendar year	377,286,000	365,387,000
Daily av. cal. year	1,336,000	1,289,000

ANTHRACITE

Nov. 18 (*b*)	1,879,000	2,191,000
Nov. 25 (*b*)	1,650,000	2,174,000
Dec. 2 (*a*)	1,815,000	1,819,000
Calendar year	85,178,000	44,943,000

COKE

Nov. 25 (*b*)	111,000	264,000
Dec. 2 (*a*)	113,000	292,000
Calendar year	5,049,000	6,894,000

(*a*) Subject to revision. (*b*) Revised from last report.

BITUMINOUS

The total estimated output of soft coal in the week ended Dec. 2, including coal coked, mine fuel and local sales, was 10,336,000 net tons, according to the Geological Survey. As Thanksgiving Day reduced the working time during that week to about 5¼ days the average daily production was 1,969,000 net tons, the highest rate attained in any week this year.

"Preliminary reports of cars loaded during the week ended Dec. 9 indicate nearly the same rate of production and a total output of about 11,100,000 tons," the report continues.

"The estimated cumulative production of bituminous coal this year to Dec. 2, inclusive, stands at 365,387,000 tons, which is 11,899,000 tons, or 3 per cent, less than in the corresponding period of 1921; 139,979,000 tons, or 28 per cent, less than in 1920; 59,717,000 tons, or 14 per cent, less than in 1919; 174,809,000 tons, or 32 per cent, less than in 1918, and 145,032,000 tons, or 28 per cent, less than in 1917. The cumulative production of soft coal during the first 284 working days of the past six years has been as follows, in net tons:

1917	510,419,000	1920	505,366,000
1918	540,196,000	1921	377,286,000
1919	425,104,000	1922	365,387,000

"The mine reports for the week ended Nov. 25 reveal the fact that increased traffic difficulties were largely responsible for the slump in production during that week. Increased losses through transportation, though generally small, were widespread and perceptible improvement occurred only in the Harlan district and in Arkansas.

"Losses attributed to no market were general throughout the Western states, except in Utah and New Mexico. Of the Eastern fields only Illinois, New River and western Kentucky showed losses of more than 1 per cent through lack of demand.

"Frequent rumors have been heard of a softening of the Eastern markets, but the limitation placed upon production by transportation disability has been such that apparently there has been little difficulty in absorbing all the coal that could be transported.

"All-rail movement of coal to eastern New York and New England increased in the week ended Dec. 2 principally and notably in the quantity of anthracite shipped. Three thousand and 55 cars of bituminous coal and 4,247 cars of anthracite were forwarded, as compared with 2,770 cars and 3,020 cars, respectively, in the corresponding week in 1921."

Railroad coal is understood to constitute the bulk of the movement recently. Prices on Southern coals are such as to

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F. O. B. Mines

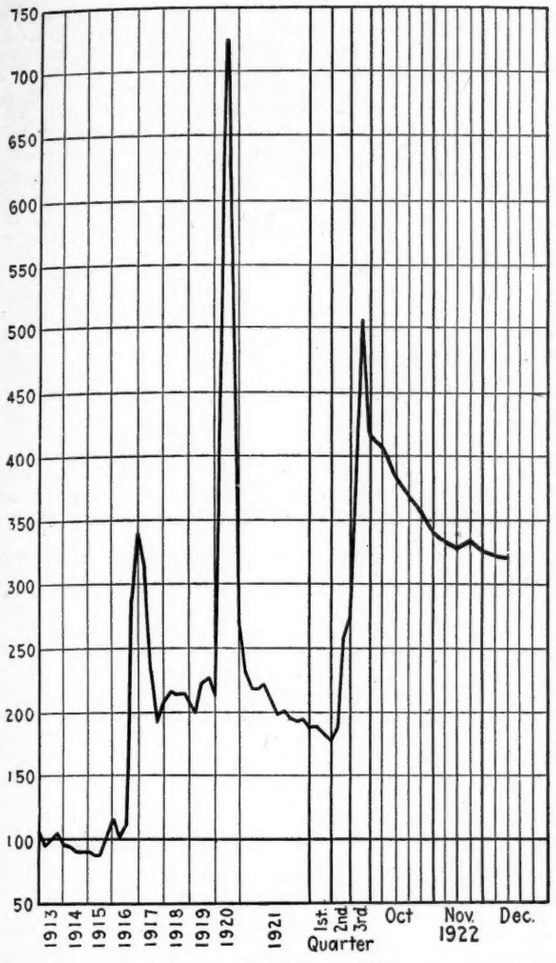
Low-Volatile, Eastern	Market Quoted	Nov. 13, 1922	Nov. 27, 1922	Dec. 4, 1922	Dec. 11,† 1922
Smokeless lump	Columbus	$6.85	$6.75	$6.50	*$6.00@$6.50*
Smokeless mine run	Columbus	6.25	6.15	6.15	*5.75@ 6.25*
Smokeless screenings	Columbus	5.85	5.75	5.75	*5.25@ 5.75*
Smokeless lump	Chicago	6.00	6.25	6.25	**7.50@ 8.00**
Smokeless mine run	Chicago	5.60	5.60	5.60	**6.00@ 6.50**
Smokeless lump	Cincinnati	6.00	6.30	6.55	5.15@ 8.00
Smokeless mine run	Cincinnati	6.10	6.00	5.40	4.85@ 6.00
Smokeless screenings	Cincinnati	6.25	5.85	5.30	4.60@ 6.00
*Smokeless mine run	Boston	7.10	8.00	7.50	**7.50@ 8.00**
Clearfield mine run	Boston	3.35	3.60	3.50	**3.25@ 4.00**
Cambria mine run	Boston	4.10	4.25	4.25	**4.00@ 4.75**
Somerset mine run	Boston	3.75	3.85	3.85	3.50@ 4.25
Pool 1 (Navy Standard)	New York	4.85	5.10	5.25	5.00@ 5.50
Pool 1 (Navy Standard)	Philadelphia	....	4.75	5.15	5.00@ 5.35
Pool 1 (Navy Standard)	Baltimore	4.50	4.85	4.85	**5.00**
Pool 9 (Super. Low Vol.)	New York	4.20	4.50	4.60	4.50@ 4.75
Pool 9 (Super. Low Vol.)	Philadelphia	4.30	4.50	4.65	4.50@ 4.85
Pool 9 (Super. Low Vol.)	Baltimore	4.10	4.60	4.10	**4.25@ 4.50**
Pool 10 (H.Gr.Low Vol.)	New York	3.50	3.85	4.95	3.75@ 4.25
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.50	3.75	3.95	3.80@ 4.15
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.35	3.35	3.35	**4.00**
Pool 11 (Low Vol.)	New York	3.00	3.25	3.00	**3.00@ 3.50**
Pool 11 (Low Vol.)	Philadelphia	3.15	3.15	3.35	3.25@ 3.50
Pool 11 (Low Vol.)	Baltimore	3.05	3.10	3.10	3.00@ 3.25
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.45	3.50	3.25	*2.60@ 3.00*
Pool 54-64 (Gas and St.)	Philadelphia	3.50	3.50	3.55	*3.00@ 3.75*
Pool 54-64 (Gas and St.)	Baltimore	3.30	3.30	3.10	*3.00*
Pittsburgh sc'd gas	Pittsburgh	4.50	4.50	4.85	**5.00@ 5.50**
Pittsburgh mine run (St.)	Pittsburgh	3.35	2.60	2.60	2.50@ 2.75
Pittsburgh slack (Gas)	Pittsburgh	3.60	3.10	3.25	3.00@ 3.50
Kanawha lump	Columbus	5.85	5.75	5.75	*5.00@ 5.50*
Kanawha mine run	Columbus	4.25	3.35	3.35	*3.00@ 3.50*
Kanawha screenings	Columbus	3.60	3.25	3.25	*2.65@ 3.00*
W. Va. lump	Cincinnati	6.10	6.25	6.25	*5.50@ 6.00*
W. Va. Gas mine run	Cincinnati	4.25	3.60	3.50	*3.25@ 3.50*
W. Va. Steam mine run	Cincinnati	3.75	3.40	3.15	**3.00@ 3.50**
W. Va. screenings	Cincinnati	3.75	3.25	3.00	2.75@ 3.25
Hocking lump	Columbus	5.50	5.05	5.05	*4.50@ 5.00*
Hocking mine run	Columbus	3.50	3.25	3.00	*2.50@ 2.75*
Hocking screenings	Columbus	3.00	3.00	2.85	*2.40@ 2.60*
Pitts. No. 8 lump	Cleveland	3.81	4.10	4.50	*3.75@ 4.50*
Pitts. No. 8 mine run	Cleveland	3.56	3.70	3.20	*$3.00@$3.25*
Pitts. No. 8 screenings	Cleveland	3.31	3.20	2.85	2.75@ 3.00
Midwest					
Franklin, Ill. lump	Chicago	5.35	5.00	5.00	**5.00@ 5.50**
Franklin, Ill. mine run	Chicago	4.10	4.10	4.10	4.00@ 4.25
Franklin, Ill. screenings	Chicago	2.60	2.50	2.50	*2.25@ 2.50*
Central, Ill. lump	Chicago	4.70	4.25	4.25	4.00@ 4.50
Central, Ill. mine run	Chicago	3.10	3.10	3.10	3.00@ 3.25
Central, Ill. screenings	Chicago	1.85	1.65	1.65	1.60@ 1.75
Ind. 4th Vein lump	Chicago	5.10	5.10	5.10	5.00@ 5.25
Ind. 4th Vein mine run	Chicago	3.85	3.85	3.85	3.75@ 4.00
Ind. 4th Vein screenings	Chicago	2.05	2.05	2.25	2.15@ 2.40
Ind. 5th Vein lump	Chicago	4.75	4.75	4.75	4.50@ 5.00
Ind. 5th Vein mine run	Chicago	3.60	3.60	3.60	3.50@ 3.75
Ind. 5th Vein screenings	Chicago	1.85	1.85	2.00	1.90@ 2.10
Standard lump	St. Louis	4.25	4.00	4.25	4.00@ 4.50
Standard mine run	St. Louis	2.50	2.60	2.60	*2.00@ 2.50*
Standard screenings	St. Louis	1.30	1.35	1.35	1.25@ 1.50
West Ky. lump	Louisville	4.75	3.75	3.75	3.50@ 4.00
West Ky. mine run	Louisville	2.55	2.25	2.25	2.00@ 2.50
West Ky. screenings	Louisville	1.75	1.50	1.50	1.25@ 1.75
West Ky. lump	Chicago	4.10	4.10	3.85	3.75@ 4.00
West Ky. mine run	Chicago	3.10	2.60	2.60	2.50@ 2.75
South and Southwest					
Big Seam lump	Birmingham	3.95	3.95	3.95	3.45@ 4.45
Big Seam mine run	Birmingham	2.35	2.35	2.35	2.25@ 2.50
Big Seam (washed)	Birmingham	2.60	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	5.50	6.10	6.10	**6.00@ 6.50**
S. E. Ky. mine run	Chicago	4.25	4.25	4.25	4.00@ 4.50
S. E. Ky. lump	Louisville	6.60	6.50	6.50	*6.00@ 6.75*
S. E. Ky. mine run	Louisville	4.25	3.75	3.40	*3.00@ 3.75*
S. E. Ky. screenings	Louisville	4.00	3.60	3.25	3.00@ 3.50
S. E. Ky. lump	Cincinnati	6.25	6.35	6.50	*5.25@ 6.50*
S. E. Ky. mine run	Cincinnati	3.85	3.60	3.35	3.00@ 3.75
S. E. Ky. screenings	Cincinnati	3.60	3.25	3.00	*2.65@ 3.00*
Kansas lump	Kansas City	5.75	5.00	5.00	5.00
Kansas mine run	Kansas City	3.75	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type.** declines in *italics.*

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	Dec. 4, 1922 Independent	Dec. 4, 1922 Company	Dec. 11, 1922† Independent	Dec. 11, 1922† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.15	$9.00	$7.75@$8.15
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@10.75	8.00@ 8.25	*9.25@10.50*	**8.00@ 8.35**
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	6.90@ 7.40	12.50@13.00	7.20@ 8.25	12.50@13.00	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@10.75	8.00@ 8.35	*9.25@10.50*	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	7.20@ 7.60	12.50@13.00	7.35@ 8.25	12.50@13.00	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@10.75	8.00@ 8.35	*9.25@10.50*	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	7.20@ 7.60	12.50@13.00	7.35@ 8.35	12.50@13.00	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.15	.....	8.15
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.00@10.00	6.15@ 6.30	7.00@10.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 8.00	6.15@ 6.20	7.00@ 8.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	5.60@ 6.10	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.50	3.50	3.50@ 4.00	3.50@ 4.25	**3.50@ 4.50**	3.50@ 4.25
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	3.25@ 4.00	4.00	3.25@ 4.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.00@ 2.75	2.50@ 3.00	**2.50@ 3.20**	2.50@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.75	2.75@ 3.00	2.00@ 2.75	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.00@ 1.75	1.50@ 2.00	**1.50@ 2.25**	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	0.75@ 1.75	2.00	0.75@ 1.75	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.25	.....	2.25

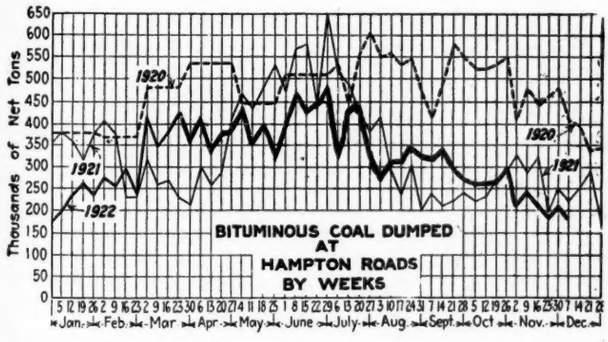
* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type,** declines in *italics.*



Coal Age Index 325, Week of Dec. 11, 1922. Average spot price for same period, $3.93. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighted in accordance first with respect to the proportions each of slack, prepared and run-of-mine normally shipped and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

encourage central Pennsylvania all-rail purchases, where the requirements and demand are more than normal for this time of the year.

Hampton Roads situation continues dull. Tonnage on hand at the C. & O. and N. & W. piers gained last week and dumpings likewise increased. At Sewalls Point, on the



contrary, coal on hand and coal dumped last week showed a decline from the previous week. The interest of the producer is in a high-priced Western market, where, however, he can ship but a small portion of his output. Eastern buyers, of course, take advantage of this, thus holding Hampton Roads prices down.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Six Months July to Dec. 1921	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Nov. 25, 1922 Inclusive	Week Ended Nov. 25, 1922
U. S. Total	45.6	55.7	....	....
Alabama	63.5	64.6	84.2	83.7
Somerset County	55.5	74.9	35.9	24.8
Panhandle, W. Va.	55.3	51.3	57.1	57.5
Westmoreland	54.9	58.8	69.6	73.8
Virginia	54.8	59.9	58.3	50.9
Harlan	53.3	54.8	20.6	25.5
Hazard	51.7	58.4	16.1	18.8
Pocahontas	49.8	60.0	35.9	29.7
Tug River	48.1	63.7	32.7	34.6
Logan	47.6	61.1	25.9	25.1
Cumberland-Piedmont	46.6	50.6	33.4	31.6
Winding Gulf	45.7	64.3	33.1	31.0
Kenova-Thacker	38.2	54.3	42.3	41.2
N. E. Kentucky	32.9	47.7	28.5	26.6
New River	24.3	37.9	31.3	31.1
Oklahoma	63.9	59.6	63.5	51.4
Iowa	57.4	78.4	73.3	61.8
Ohio, Eastern	52.6	46.6	42.8	39.9
Missouri	50.7	66.8	72.1	83.7
Illinois	44.8	54.5	49.5	48.3
Kansas	42.0	54.9	53.6	36.7
Indiana	41.4	53.8	37.7	(a)
Pittsburgh†	41.2	39.8	41.6	41.3
Central Pennsylvania	39.1	50.2	56.0	41.2
Fairmont	35.3	44.0	40.2	35.7
Western Kentucky	32.5	37.7	33.9	38.5
Pittsburgh*	30.4	31.9	56.6	67.4
Kanawha	26.0	13.0	15.4	20.1
Ohio, southern	22.9	24.3	38.5	38.7

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended Nov. 25, 1922	955,495	202,032
Previous week	969,094	205,024
Same week in 1921	673,465	138,020

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
Nov. 23, 1922	5,306	.....	152,565	43,683
Nov. 15, 1922	4,945	.....	158,236	42,827
Same date in 1921	215,000	90,000	.....	.....

End of the Lake season is fast approaching. During the week ended Dec. 11 cargo coal dumped reached 280,602 and fuel coal 8,267 net tons, a total of 288,869, which is a high figure for this time of the year. The season's total is now past the 19,000,000-ton mark, approximately 4,000,000 tons behind last year. The Northwest is abundantly supplied with soft coal, for on top of the Eastern coal via Lake, all-rail coal from Illinois keeps pouring in.

ANTHRACITE

Work at the anthracite collieries virtually ceased on Thanksgiving Day, and in consequence production for the week ended Dec. 2 declined to 1,819,000 net tons, according to the Geological Survey. This estimate is based on shipments of 34,788 cars, including besides freshly mined coal, that recovered by washeries and river dredges, and allowances for mine fuel and sales to the local trade. Although this was less than in recent preceding weeks it was 10 per cent more than the output in Thanksgiving Day week of 1921 (1,650,000 net tons). Preliminary reports of cars loaded during the first four days of the week of Dec. 4-9 indicate that output will be about 2,100,000 tons.

COKE

Production of beehive coke improved slightly during the week ended Dec. 2, in spite of the occurrence of Thanksgiving Day, according to the Geological Survey. The total output is estimated from railroad shipments at 292,000 net tons, an increase of 4,000 tons over the week before. With the exceptions of Utah and Washington, all districts showed improvement, or at least maintained the record of the week preceding.

The steady improvement in the Connellsville region that began early in June finally halted and, according to the *Connellsville Courier*, the output in that region decreased from 201,100 to 193,770 tons. The *Courier* attributes the decline to the temporary shutdown of two furnaces for repairs, with a consequent curtailment in demand for coke.

Foreign Market And Export News

British Coal Output Again Shatters Record; Buying Pressure Relaxes

After a slump during the week ended Nov. 18, British coal output recovered and during the week ended Nov. 25 established a new high mark for the year, with 5,472,000 tons mined. This is 96,000 tons greater than the previous week's output and 31,000 tons more than the previous record made during the week ended Nov. 11.

Buying pressure has now relaxed, but new business is coming along at a steady level for best grades and collieries are not concerned with the outlook, showing no desire to relax prices materially. Current exports are still up to the pre-war level. Colliery owners are well booked for the next week or so, so far as the superior grades are concerned, but secondary and lower grade coals, especially smalls, are still in greatly excessive supplies.

There has been a disposition on the part of foreign buyers, in view of the adverse exchange rates and other factors, to hold back fresh orders with the object of forcing down prices, but with the approach of the Christmas holidays owners believe that this holding-off process will not last long.

Increased exports are reported to France, South America, Spain, Greece and coaling stations, but Italian shipments declined approximately 22,000 tons and minor declines are recorded to Portugal, Canada and other countries. The direction of export for the week ended Nov. 17 was as follows:

To	Tons
France	121,145
Italy	45,761
South America	74,950
Spain	18,235
Portugal	8,018
Greece	9,215
U. S. A.	14,582
Canada	5,127
British coal depots	64,198
Other countries	74,229
Total	435,460

The coal market in north England is quiet. Buyers are showing a tendency to hold off. Germany, though in need of coal, finds the exchange so adverse that deliveries are being postponed for the present. The collieries are well booked up for the most part to the end of the year and concessions in prices are confined to buyers with tonnage which will fit into loading positions. There are complaints of congestion and delay in loading at the Tyne ports and the teamers and trimmers have been urged to return to the three-shift system of working as the only remedy, so far without success.

Welsh owners are complaining bitterly of inadequate loading facilities at Cardiff and are pressing for longer working hours for loaders. The Great Western Ry. has made a request to the coal tippers and trimmers to accept the three-shift system of working at the docks. The workers have opposed the three-shift system all along, and still express emphatic opposition to the change. The colliery owners and coal exporters generally advocate the three-shift system, as savings could be made in freight and dock charges, which would help to cheapen the cost of coal to foreign ports.

Output Greater in Northern France

Most of the collieries of the Nord and Pas-de-Calais are unable to accept new orders for domestic coals except for delivery after the end of the present year. Industrial coals also are becoming scarcer.

Pithead stocks in that coal field, which in April last amounted to nearly 2,000,000 tons, have gradually decreased until now they may be estimated at about 300,000 tons.

On the other hand, the coal output of the North of France had increased as follows in October:

	Sept., 1922 Tons	Oct., 1922 Tons
Non-devastated mines of the Pas-de-Calais	616,006	638,190
Devastated mines of the Nord and Pas-de-Calais	694,234	728,164
Totals	1,310,240	1,366,354

British coal imports, which had increased in October have been interfered with to some extent by the recent rise of sterling. For the same reason French coals made a quite unusual appearance on the Antwerp market.

The situation in the French Central and Southern coalfields, excellent for domestic coals, is fairly satisfactory for industrial coals, although the iron works in that part of France might be more active.

Coke from the Loire coal field is in good demand from Switzerland and Italy.

Sarre coals, owing to the collapse of the mark, are being more largely diverted from German into French home markets.

Parisian coal factors who agreed to an increase in contract prices in order to obtain domestic coal contracted for in Belgium—a step which was against all admitted rules—find deliveries no better since the revision than before, and their association has just written a strong letter about it to the Association Charbonnière du Bassin de Charleroi.

From Nov. 1 to Nov. 19, inclusive, Germany has delivered to French blast-furnaces 219,000 tons of reparation coke, which is at the rate of 346,000 tons per month, whereas 410,000 tons per month is due.

In October 1,261,499 metric tons of coal were received in French maritime ports, as follows:

	Metric Tons
British coals	1,149,897
German coals	109,719
Belgian coals	1,883
Total	1,261,499

IMPORTS

Coal

From	Oct., 1922	First 10 months of 1922
Sarre	286,798	2,912,454
Great Britain	998,909	9,621,589
Belgium	203,262	2,010,095
United States	.....	23,255
Germany	254,125	3,110,828
Netherlands	24,536	510,397
Other countries	117	3,823
Totals	1,767,747	18,192,441

Coke

Great Britain	1,406	42,021
Belgium	38,948	409,005
Germany	372,981	3,522,442
Other countries	27,644	188,812
Total	440,979	4,162,280

Patent fuel

Great Britain	6,775	116,471
Belgium	14,230	606,809
Germany	55,486	398,099
Other countries	360	4,103
Totals	76,771	1,125,482

EXPORTS

Coal

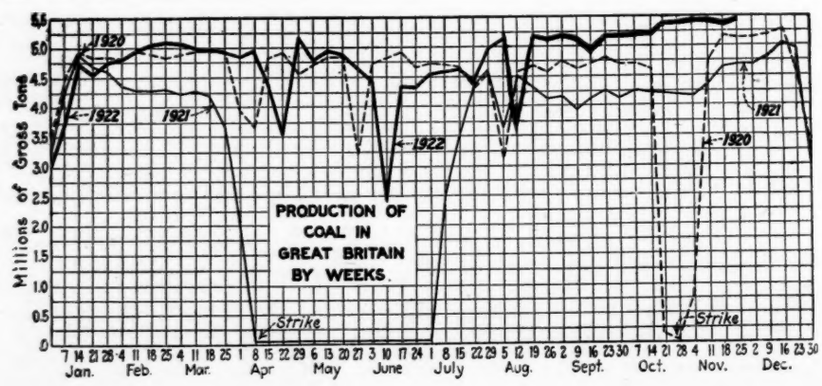
To			
Belgium		61,406	291,395
Switzerland		85,773	444,558
Spain		74	488
Italy		21,635	41,836
Germany		114,054	360,643
Austria		.....	697
Other countries		102,951	313,827
Bunkers	French steamers	10,497	73,134
	Foreign steamers	4,089	25,148
Totals		400,479	1,551,726

Coke

Switzerland	16,204	72,875
Spain	365	1,548
Italy	10,890	141,481
Germany	1,348	8,604
Other countries	17,342	158,898
Total	46,149	383,406

Patent fuel

Switzerland	2,439	26,511
Austria	.....	4,187
Other countries	4,919	32,611
Bunkers French steamers	4,005	16,131
Bunkers Foreign steamers	20	673
Totals	11,383	80,113



United States October Coal Exports

(In Gross Tons)

Coal:	October, 1921	October, 1922
Anthracite	306,082	404,999
Bituminous	1,330,304	1,729,425
Exported to:		
France	480	.....
Italy	33,012	.....
Other Europe	1,226	145
Canada	1,124,718	1,647,323
Panama	19,229	9,485
Mexico	10,377	7,048
British W. Indies	10,201	8,736
Cuba	43,328	48,702
Other W. Indies	7,827	6,704
Argentina	30,133	.....
Brasil	15,892	.....
Chile	1,017	.....
Uruguay	.....	.....
Egypt	12,385	.....
French Africa	13,588	.....
Other Countries	6,891	1,282
Coke	22,256	38,613
Briquets and other compositions	.....	1,923

British Coal Exports in October

Country	Gross Tons 1920	1921	1922
Russia	8,008	34,648	112,254
Sweden	50,802	204,398	225,840
Norway	46,364	91,341	116,140
Denmark	68,235	260,919	287,874
Germany	.....	114,333	918,598
Netherlands	11,181	255,545	697,920
Belgium	30,899	119,325	298,420
France	745,608	879,149	1,143,552
Portugal	25,379	53,686	47,109
Azores and Madeira	.....	3,116	6,744
Spain	30,794	120,900	113,970
Canary Islands	12,412	19,598	32,443
Italy	171,837	474,412	642,159
Austria	1,401	.....	.....
Hungary		.....	.....
Greece	4,987	29,393	16,699
Algeria	17,259	61,108	66,179
French W. Africa	8	4,024	10,119
Port. W. Africa	5,471	6,707	16,825
Chile	112	1,951	5,518
Brazil	.....	19,573	83,758
Uruguay	2,835	.....	29,668
Argentine Republic	11,043	111,792	200,509
Channel Islands	8,410	13,939	11,832
Gibraltar	49,069	35,886	57,846
Malta	19,528	6,057	38,397
Egypt	51,619	115,159	130,760
Anglo-Egypt. Sudan	.....	3,505	10,623
Aden and Depend.	5,529	.....	3,881
British India	.....	134,704	14,893
Ceylon	.....	10,904	14,381
Other Countries	38,708	219,900	841,500
Total, October	1,417,498	3,405,972	6,196,411
Total September	1,475,623	3,406,579	7,082,729

QUANTITY AND VALUE

	Gross Tons October	1st 10 Mos.
1920	1,417,498	21,269,053
1921	3,405,972	16,757,526
1922	6,196,411	51,672,984

	Value October	1st 10 Mos.
1920	£6,108,497	£84,600,973
1921	4,851,452	32,707,611
1922	6,992,631	58,403,566

World Coal Production, July-August

In comparing present coal production with the average pre-war production it will be seen that France, on account of her gain in territory, produces more coal at present than before the war and this in spite of the fact that the coal mines in the northern departments of that country suffered seriously during the war. In addition to her own production France receives monthly about one million tons of so-called reparation coal, so that the country is better off than before the war as far as coal is concerned. The greatest decrease has taken place in the United States, probably on account of the miners' strike. German production remains far behind that of the ante-war time—by about one-third—chiefly due to the loss of mining districts and partly due to the decreasing output. Great Britain's coal production also remains considerably behind pre-war time, but has largely increased as compared with the preceding year (miners' strike) partly due to the strike in America. An increase in production as compared with ante war production took place in the Netherlands, South Africa and Japan.

MONTHLY AVERAGE OF COAL PRODUCTION

Countries	In Million Tons 1913	1921	1922 July	August
Germany	15.84	11.35	9.59*b*	10.21*b*
France	3.40*a*	3.21	3.51	.....
Belgium	1.90	1.82	1.67	1.70
Netherlands	0.16	0.33	0.39	0.39
Poland	.....	0.63	.....	.....
Czechoslovakia	1.19	0.97	0.78	.....
Great Britain	24.34	13.76	18.92*c*	19.37*c*
United States	43.10	38.09	15.56	20.36
Canada	1.14	0.89	.....	.....
South Africa	0.67	0.87	0.82	0.79
Japan	1.78	1.94	1.96	.....
Total	93.52	73.86	.....	.....

(*a*) Since 1921 including Alsace-Lorraine and Saar.
(*b*) Exclusive of lost part of Upper Silesia but including the district of Beuthen.
(*c*) Four weeks.

Increased Bunkering in Liverpool

The expansion in Mersey bunkering in 1922 as compared with 1921, says a Northern weekly, is illustrated in the figures for October, which are now available. These show that in the ten months ended October there was an increase in bunker shipments from Liverpool of 742,790 tons as compared with the ten months of 1921, and 267,578 tons increase in Manchester bunker shipments over the figures of 1921. The official bunker shipments for the two ports for the ten months of this year as compared to 1921 are as follows:

Liverpool Ten Months Ended October 1921 Tons	October 1922 Tons	Manchester Ten Months Ended October 1921 Tons	October 1922 Tons
1,155,157	1,897,947	67,554	335,132

The relative positions which the main bunkering ports occupy so far as volume of bunker export is concerned for the month of October, 1922, was as follows:

Port	Quantity Shipped Tons
Cardiff	246,716
Liverpool	212,919
Newcastle and South and North Shields	141,128
Hull	132,335
Glasgow	111,652
London	110,439
Manchester	29,492

The total shipments as cargo from Liverpool in October of this year were 79,232 tons, and from Manchester 34,829 tons, and the total from the northwestern ports of the United Kingdom 114,561 tons, which compares with a total of 10,856 tons in October, 1921.

Export Clearances, Week Ended Dec. 2, 1922

FROM HAMPTON ROADS

For Cuba: Tons
Br. SS. Berwindvale, for Havana....6,000
For West Indies:
Nor. SS. Corona, for St. Thomas.....4,673

FROM PHILADELPHIA

For Cuba:
Am. Schr. Lillian E. Kerr, for Cienfuegos .....
Am. Barkentine, Cecil P. Stewart, for Cayo Francis .....
For West Indies:
Am. Schr. Victoria S. Rathburn, for Fort de France.....

POLAND—According to statistics from Kattowitz the coal production in Polish Upper Silesia from Oct. 23 to 29 amounted to 461,728 tons. Of this, 231,686 tons were sent abroad to various states of central and northern Europe, Germany getting the largest quota, 167,562 tons, Austria next with 44,062 and Czecho-Slovakia, 1,834 tons.

Week-End Strength at Hampton Roads

The market at Hampton Roads showed signs of strength at the end of the week, although dullness was the main feature throughout the period. Car shortage continued the outstanding factor in the trade, with little prospect of immediate improvement in the situation.

Bunker business was showing some activity, but the coastwise and foreign trade was extremely dull. January 1 was the earliest date set by shippers as promising any improvement in a general way.

The market was spotty during the week, prices depending somewhat on the class of cargoes demanded. Few dealers had sufficient supplies to give any sort of flexibility to their trade. Small lots in most instances were the general thing.

Hampton Roads Pier Situation

	Week Ended Nov. 30	Dec. 7
N. & W. Piers, Lamberts Pt.:		
Cars on hand	444	701
Tons on hand	32,277	49,953
Tons dumped for week	54,336	77,788
Tonnage waiting	8,375	8,100
Virginian Ry. Piers, Sewalls Pt.:		
Cars on hand	1,014	902
Tons on hand	58,950	50,400
Tons dumped for week	122,895	82,821
Tonnage waiting	28,423	14,638
C. & O. Piers, Newport News:		
Cars on hand	452	506
Tons on hand	22,600	25,800
Tons dumped for week	34,133	36,017
Tonnage waiting	6,400	325

Pier and Bunker Prices, Gross Tons

PIERS

	Dec. 2	Dec. 9†
Pool 9, New York	$7.50@$7.75	**$7.75@$8.00**
Pool 10, New York	7.00@ 7.35	**7.25@ 7.50**
Pool 11, New York	6.25@ 6.50	6.25@ 6.50
Pool, 9, Philadelphia	7.55@ 7.90	7.55@ 7.90
Pool 10, Philadelphia	7.00@ 7.25	7.00@ 7.25
Pool 11, Philadelphia	6.60@ 6.80	6.60@ 6.80
Pool 1, Hamp. Roads	7.75@ 8.00	*7.65@ 7.75*
Pools 5-6-7 Hamp. Rds.	7.50@ 7.75	*7.65*
Pool 2, Hamp. Rds.	7.75@ 8.00	7.75@ 8.00

BUNKERS

Pool 9, New York	$7.90@$8.15	**$8.15@$8.40**
Pool 10, New York	7.40@ 7.80	**7.65@ 7.90**
Pool 11, New York	6.65@ 6.90	6.65@ 6.90
Pool 9, Philadelphia	7.90@ 8.20	7.90@ 8.20
Pool 10, Philadelphia	7.35@ 7.50	7.35@ 7.50
Pool 11, Philadelphia	6.85@ 7.10	6.80@ 7.10
Pool 1, Hamp. Rds.	7.75@ 8.00	*7.75*
Pool 2, Hamp. Rds.	7.75@ 8.00	7.75@ 8.00
Welsh, Gibraltar	38s. f.o.b.	38s. f.o.b.
Welsh, Rio de Janeiro	57s. 6d. f.o.b.	57s. 6d. f.o.b.
Welsh, Lisbon	50s. f.o.b.	50s. f.o.b.
Welsh, La Plata	50s. f.o.b.	50s. f.o.b.
Welsh, Genoa	42s. t.i.b.	42s. t.i.b.
Welsh, Algiers	38s. f.o.b.	38s. f.o.b.
Welsh, Pernambuco	65s. f.o.b.	65s. f.o.b.
Welsh, Bahia	65s. f.o.b.	65s. f.o.b.
Welsh, Madeira	40s. 6d. f.a.s.	40s. 6d. f.a.s.
Welsh, Teneriffe	38s. 6d. f.a.s.	38s. 6d. f.a.s.
Welsh, Malta	41s. f.o.b.	41s. f.o.b.
Welsh, Las Palmas	38s. 6d. f.a.s.	38s. 6d. f.a.s.
Welsh, Naples	39s. 3d. f.o.b.	39s. 3d. f.o.b.
Welsh, Rosario	52s. 6d. f.o.b.	52s. 6d. f.o.b.
Welsh, Singapore	50s. t.i.b.	50s. t.i.b.
Welsh, Constantinople	50s. f.o.b.	50s. f.o.b.
Welsh, St. Michaels	50s. t.i.b.	50s. t.i.b.
Welsh, Port Said	49s. f.o.b.	49s. f.o.b.
Welsh, Oran	38s. f.o.b.	38s. f.o.b.
Welsh, Fayal	50s. t.i.b.	50s. t.i.b.
Welsh, Dakar	42s. 6d. f.o.b.	42s. 6d. f.o.b.
Welsh, St. Vincent	42s. f.a.s.	42s. f.a.s.
Welsh, Montevideo	50s. f.o.b.	50s. f.o.b.
Welsh, Alexandria	42s. f.o.b.	42s. f.o.b.

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations by Cable to Coal Age

Cardiff:	Dec. 2	Dec. 9†
Admiralty, large	28s.@ 28s. 6d.	**28s. 6d.@ 29s. 6d**
Steam, smalls	16s.@ 16s. 6d.	**17s. @ 18s.**
Newcastle:		
Best steams	25s. 6d.@ 26s.	*25s. 6d.*
Best gas	24s.@ 25s.	*24s.@ 24s. 6d.*
Best bunkers	22s. 6d.@ 23s. 6d	**23s. 6d.**

† Advances over previous week shown in **heavy type**: declines in *italics*.

North Atlantic

Prices Firm on High Grades, Slipping on Low Qualities

Car Supply Improves Slightly—Buyer's Insistence on Quality Prevents Price Recession—Railroads Heaviest Buyers—Woodin's Order Expected to Be Helpful Factor.

An indication of the market situation in this territory is found in the firmness of prices on high-grade coal, while quotations on low-grade coal here and elsewhere over the country are slipping. Car supply is slightly improved in a number of spots but the insistence of the buyer on quality has prevented marked price recession.

Railroads are now the heaviest buyers. Some of them are accumualting good stocks. Here and there there is some inquiry for delivery after the first of the year for storage against another big strike, but the market is not the least nervous over this possibility at this writing. Producers are more concerned now with getting for their coal a price that will yield a profit on the short car supply than in quoting prices for the first quarter of next year.

Fuel Administrator Woodin's order to buy one-fourth substitute as fuel with household anthracite is calculated to relieve the pressure on bituminous coal as well as anthracite steam sizes at Tidewater.

NEW YORK

The better grades are growing stronger and scarcer. At times operators are in a position to take care of orders and offer reasonably quick delivery, while at other times this is impossible because of the uncertain car supply.

There is a heavy demand for prepared bituminous domestic coals and most houses are heavily booked ahead. Quotations on some grades are from $6.25 for furnace to $6.50 for range.

The Southern market is tightening considerably, reports indicating that some operators are hesitating to accept further business.

Shipments of British coal to this port have practically ceased. A local house points out that British coal can be landed in Boston at $1 less cost than American coals.

There were 1,866 cars at local terminals Dec. 8 as compared with 1,478 cars Dec. 2. Comparatively little of this tonnage was better than Pool 11 grade while there was considerable of cheaper coals.

Some fancy grades were quoted around $4.75; low-sulphur gas coal, run-of-mine, $3.50@$4; ¾ lump, $4.35@$4.50; high-volatile steam grades, $2.75@$3.25, and slack, $2.50@$3.

PHILADELPHIA

The spot market on the distinctly high-grade coals remains quite stiff at last week's prices, with some reporting advances. The supply of cars nowhere seems to be anywhere near the demand and unless decided relief is soon given, prices must soar still higher.

The consumer remains fairly cheerful and pretends to be puzzled for a reason for the recent stiffening of prices. However, those with orders placed several weeks ago at more favorable than the current prices are now insisting on prompt shipments. The railroads are still the biggest takers of fuel, and have accumulated good stocks.

Some shippers are not particularly anxious for business even at present prices, as they are doing their best to clean up orders placed three or four weeks ago. This refers to the best of the low-volatile steam coals and some high-grade gas fuel.

At tide there is only ordinary bunkering, while pier business is not even that.

BALTIMORE

The early part of last week witnessed a slide in prices for all except the better grades of soft coal, but the recession proved brief. At this writing there has developed a decided call for fuel from large consumers, public service corporations being particularly active in purchasing.

Several coal men here who had reported that they were having difficulty in getting rid of Pool 11, and even Pool 10, now say these are absorbed as rapidly as offered. During the past week while Pool 9 coal held pretty well above $4, the net ton f.o.b. mines, Pool 10 was offered around $3 50, Pool 11 around $2.75 and Pool 18 at from $2.25 to $2.50. The gas coal market was off also, Pool 64 being obtainable in many cases at $2.75 and Pool 63 at $3.25@$3.50. At this writing, however, there has been an advance of 25@50c. right along the line and not much of Pool 10 is now on the market below $4. Very little of Pool 9 is now offered here and is readily commanding $4.50.

FAIRMONT

Keeping pace with the general market, prices have been showing a downward trend, but marked recessions have been prevented owing to the fact that a shortage of cars is still retarding production. Yet car service is somewhat better, in spots at least, and some mines during the period ending Dec. 2 had as large a supply as 50 per cent. In general the range on mine-run is $2.75@$3.25, with egg and lump ranging $4.50@$4.75.

CENTRAL PENNSYLVANIA

Improvement is noted in the situation both as to cars and prices. A new market is opening for bituminous coal that can be adapted to use where formerly anthracite was used. Coals for this use are found in Pools 1, 9 and 71 and the price is strong at $4.75@$5. Pool 10 advanced from $3.90 to $4.10, and Pool 11 from $3.50 to $3.75. Railroad supply cars are being cut down, thus leaving more cars for commercial distribution.

Production for the month of November will reach 80,000 cars, as compared with 82,714 in October. Complete figures are not yet available. During the week ending Nov. 26 the production was 18,553 cars as against 19,849 cars the previous week.

UPPER POTOMAC

Upper Potomac and Georges Creek fields in the aggregate have not been able to produce as much coal as during the latter part of November chiefly because Upper Potomac mines fell behind previously established records to the extent of 13,000 tons. The loss was solely attributable to a car shortage, market conditions having played little or no part in curtailing production, though prices have been declining as the demand waned somewhat. Pool 18 is bringing as low as $2.50 per ton.

West

DENVER

Car supply that is growing slowly better continues to increase the output of Colorado and the market in this city and elsewhere in this region has whetted up sufficiently to absorb the production without much forcing. Domestic demand is fairly strong and industrial call for steam coal is picking up a little. Canon City and Walsenburg lump is selling at the mine for $6@$6.50 and Trinidad lump at $5.50. Nut from these fields runs about 50c. lower than this. There is a noticeable firmness in all domestic coals.

KANSAS CITY

"No-bill" cars in the southern Kansas field have begun to move. The surplus at the mines is estimated at from 50 to 75 per cent less than it was two weeks ago. This is attributed partly to the advent of colder weather but more to idle time at the mines. One company, with headquarters in Kansas City, reports its mines have been operating only 25 per cent of normal, while other firms report between 25 and 50 per cent.

The transportation situation remains about as it has been since September, with perhaps a little more blame for slow movements placed upon lack of motive power than upon lack of cars. It is estimated that at the present rate of demand, dealers have sufficient coal in their yards to last 30 days. Quotations on Kansas coal are: Lump, $5; nut, $4.50; screenings, $2.50. Arkansas semi-anthracite lump is $6 and screenings $1.50@$2.

SALT LAKE CITY

Mines are working around 56 per cent of capacity now. Market conditions are fair. The demand for lump coal is such that the smaller sizes may soon constitute a problem. Stocks in Salt Lake City are still low but now that the car situation has improved the severest weather is not likely to precipitate a crisis. Labor conditions are excellent.

Anthracite

Wintry Winds and Bare Bins Stir Tardy Householders

Cold Blast More Potent Than Warm-Weather Warnings—If Present Output Can Be Maintained Anthracite Problem Will Be One of Distribution.

Cold weather is focusing attention of the householder on the ever present lack of sufficient anthracite to meet his needs. Warm weather warnings of shortage to come broadcast by every local administrator and retail dealer in New Jersey and New York failed to stir the householder like one week of sharp cold and a short supply in the cellar.

Providing production can be maintained at its present rate of around 2,000,000 net tons per week, which figures, of course, include about 200,000 tons, or 10 per cent used by the mines themselves, the anthracite situation may be summed up as a problem in careful distribution aiming at eventual equality but seeking to fill the more distant points first.

The market for steam sizes in anthracite continues exceedingly dull. Some are hopeful that buckwheat at least may move in more volume as a substitute for larger sizes when the consumer gets really pinched.

NEW YORK

In an effort to relieve the domestic situation and at the same time reduce the tonnage of small coals on the railroad terminals in New Jersey, in boats and in the retail yards the State Fuel Administration on Dec. 8 issued instructions to retailers that deliveries of two tons or more of grade, broken, egg, stove, chestnut or range coal must be preceded or accompanied by not less than 25 per cent of buckwheat, coke, bituminous or other substitutes.

Dealers are buying more independent coal because of the demands made upon them and inability to obtain larger shipments from the companies.

Outside of price increases already announced by some of the companies, some of the larger independents have advanced their quotations, mostly to cover the Pennsylvania State Tax.

Consumers here need not go without fuel. When they are unable to get the particular size wanted there is always some substitute available. No suffering has been reported as yet.

Quotations reported during the week included some washery chestnut at $12.75 and washery pea at $9.75 f.o.b. mine.

The steam-coal situation is clearing up. At the end of the week there were upward of 100 loaded boats in the harbor, some of which it was said had been loaded a couple of months. All three sizes are stronger, with rice the most inactive. The better grades of independent buckwheat and rice were quoted above company circular while some cheaper grades were quoted below.

BUFFALO

Delivery is still slow, though emergency cases are not as numerous as they were. Complaints are made that with a good increase of mining over former autumns much less coal has been sent this way than in the past.

Shippers who handle independent anthracite say that the demand for that coal is so active that prices are stiffening. They find it next to impossible to get any coal unless one stays on the spot and sees that the cars are not billed to anyone else. Canada has been buying Welsh anthracite at about $18 delivered, but that is now cut off by the closing of the St. Lawrence River season.

The lake trade, which is coming to a close, has been smaller than expected. At the close of November shipments were 947,080 net tons. Shipments for the first six days of December were 56,300 tons. Freight rates since Dec. 1 have been uniformly $1 per ton.

BALTIMORE

The hard coal situation is not at all satisfactory but dealers realize that this is a general situation and not a local one. As a matter of fact nature was a bit good to Baltimore during the recent very cold snap which swept the West and Northwest by sending the cold area around this section and not through it. The result has been that while the period since Dec. 1 has had some raw days it has not been marked by extremely cold ones and coal consumption was held down very materially. Dealers, however, are rather anxious about the last days of December and are hoping that there will be a material increase in shipments here.

During October Baltimore coal dealers received a total of 1,478 cars of anthracite, but November saw a drop of 213 cars from this record. December so far has failed to show any increase. Dealers in Baltimore are trying as far as possible to co-operate with the Maryland Fuel Distribution Committee, and agreed willingly to take care of emergency cases whenever possible.

PHILADELPHIA

Colder weather has increased demand, with dealers poorly prepared to meet it. Though mine prices have been radically increased by some independents, and lesser advances made by company shippers, the increase in retail prices has been moderate. There is still quite a good deal of coal being sold at $14.50 for family sizes and $11.50 for pea. Of course this is by dealers who are getting mostly company coal. Other dealers have increased from that point up to $16.

Substitutes, such as bituminous coal and coke, are making headway. Progress also is being made on buckwheat as a domestic fuel, although most dealers insist that a portion of buckwheat must go with each order for larger sizes. Yet even on this fuel dealers are reporting satisfied customers who have used the coal in steam heaters without mixture, and expect a regular trade on this size in the future. Prices for buckwheat at retail are $8 @$9.25.

The steam coal market is better. Little free buckwheat is available at less than $3.50 and many smaller producers with the good grades are getting $4. Of course the companies have not cut this price. Rice is still plentiful, with probably the least improvement shown in this size. Barley is in good demand, but with a fair supply still offered on the market.

BOSTON

Domestic sizes are seriously in short supply in most of the cities. It is difficult to generalize for the whole of this territory, for distribution is by no means horizontal, depending upon originating companies that have varying policies in sending coal forward. A really notable effort has resulted in adequate supplies for the present to points like Bangor and Augusta up the Maine rivers, but ports open to navigation through the winter have been kept on hand-to-mouth deliveries. There is some ground for expectation, however, that after Jan. 1 the general situation will be easier.

There is no special change is the retail situation. The City of Boston has landed at the Navy Yard a cargo of Welsh steam coal, called "semi-anthracite," and is making deliveries at $14.50 per net ton. Retail dealers are managing measurably well to keep regular customers supplied with small amounts; the great difficulty is over householders who duplicate orders.

South

BIRMINGHAM

So far the approach of the holidays has stimulated the market very little. The railroads are reported as buying a little extra coal for stocking, but aside from this, general demand is no greater than for several weeks past. There is no surplus supply, however, as production is restricted by car shortage.

Domestic grades are still in strong demand and scarce, conditions in the steam trade limiting supply from commercial mines and lack of equipment adversely affecting both classes of operations. Dealers are receiving about enough coal to meet outgo to consumers.

Prices on both steam and domestic grades are practically unchanged from last week. Production is about 340,000 net tons per week. Car supply ranges from 40 to 60 per cent of normal requirements, the former representing the supply at furnace mines and the latter that of commercial and domestic operations.

VIRGINIA

Losses in production have resulted from inability of the railroads to keep up car supply, one result of which has been to increase the production of coke, which now amounts to about 12,000 tons a week. "No market" losses have not made their appearance, the demand still being amply sufficient to absorb all that the field can produce.

Chicago and Midwest

Market Slightly Better For Both Steam and Lump

Both Far Below Normal for This Time of Year—Even Raw Weather and Indiana Strike Threat Have Little Influence—Cars More Numerous.

The recent slump of domestic coals was practically stopped during the past week by raw weather but the general market remained so quiet that the volume of fuel offered dwindled. This had the inevitable effect upon steam coal, which strengthened slightly but did not develop into anything even faintly resembling a rush. A consistent effort on the part of a few railroads and a group of big consumers to restrain Illinois prices by accepting considerable quantities of cheap western Kentucky coal has had the desired effect in Chicago. The demand for select domestic has increased the price of Eastern smokeless a little, but that is primarily because there is almost none to be had.

What little strength there is has been more apparent in Chicago than elsewhere, though in Kentucky there is a better feeling in both domestic and steam, and in St. Louis, while domestic demand is nearly flat, steam has picked up ever so little. Car supply generally is better just at a time when "no bills" are numerous.

SOUTHERN ILLINOIS

Last week's story of this region is a repetition of the report for the past few weeks: Warm weather and no demand. The only coal moving with any ease is screenings. Larger sizes go only under pressure. While the association operators are still maintaining their prices, the ranks of the independents seem to be growing. Association prices are $5.50 for lump, egg and nut. The independents have gotten down to $3 for nut and from $3.50 up for lump and egg.

Some mines have a hard time working two days a week on account of no orders. There seems to be plenty of cars for the business offered. A shortage of water is a serious factor. The same conditions prevail in the Duquoin field as to prices, working conditions and water supply.

Mt. Olive district is almost at a standstill. A little coal is moving north and west and steam sizes to Chicago and on contract, but the domestic demand is almost nil. Domestic prices in this field still stick at $4 for St. Louis shipments and range from $4.50 to $5 in the country. The railroad tonnage is fairly good out of both Mt. Olive and Carterville fields.

The Standard mines are about demoralized on prices. Two-inch lump is around $2.50, steam, nut and egg $2 @$2.25 and screenings $1.25@$1.50. The 6-in. lump is from $3 up. Everything is hard to move and most mines have unbilled coal. Car supply is in excess of the demand.

ST. LOUIS

Summer weather prevails, with summer business. Domestic buying is at a standstill. Steam wagon business is unusually light on account of the weather and carload business is slow. The only demand is for a little screenings.

All over the Middle West cars are strung out on consignment and a lot of coal is rejected because it was not ordered or because the dealers have refused it for any one of several reasons. Dealers are all loaded and cannot take any further shipments regardless of price. A little anthracite is moving through. No smokeless and nothing from Arkansas is arriving. Some Alabama coke is coming to this territory to replace anthracite chestnut, but the tonnage is light.

WESTERN KENTUCKY

It is reported that demand has been just a little better the past week as a result of colder weather. Prepared leads while mine-run sells in fair volume. Increased consumption by heating plants and better industrial buying are making the market slightly firmer.

As a rule car supply is taking care of present demand fairly well, although the usual complaints are heard. A fair tonnage is moving out through the state and South, with some into southern Indiana and to St. Louis. River movement from western Kentucky has been checked for weeks by low water, but recent heavy rains are expected to improve boating stages.

Prices in the western Kentucky field are firm. Mine-run is $2@$2.50; lump, $3.50@$4; screenings, $1.25@$1.50 for pea and slack, and $1.50@$1.75 for nut and slack. Demand for egg and nut is improving.

INDIANAPOLIS

Little change was seen in the coal situation in Indiana until the threat of an immediate strike was made. Then most big buyers who depend upon Indiana mines started a rush for coal. Warmth has held down domestic trade. Better transportation facilities are providing plenty of coal for industries. Prices are about the same though there is a little strength in steam coal. There appears to be slightly more demand than a month ago, but the slight increase in demand has had little to do with the price. Industrial users say they can get screenings at around $2.25 at the mine. There is no apparent effort to begin building up reserves, though the threatened tie-up of Indiana mines is causing some concern.

CHICAGO

A gentle pick-up in domestic demand from various quarters and a continuance of the steady but slow call for screenings characterize the market. Raw weather has had small effect upon domestic trade. Yards still have so much soft coal on hand that it will require the worst kind of winter to empty them and create much liveliness. Steam consumers show little sign of heavy stocking. They still are satisfied to go along slowly, picking up a little fuel for storage only when considerable quantities got into distress here.

The only recent increase in price on this market is in Eastern smokeless, which reaches here in the thinnest kind of stream. Smokeless mine-run brings $6@$6.25 and those occasional cars of lump and egg which appear bring $7.50 @$8.25. The presence of a fair quantity of anthracite has its effect on West Virginia domestic. Thus, while southern Illinois circulars have steadily quoted lump and egg at $5.50, there have been various recessions. Today, however, that price is fairly firm and central Illinois is maintaining its $4.50 level with much better success. Eastern Kentucky prepared stays well above $6.

LOUISVILLE

Colder weather has resulted in slightly better demand for prepared sizes, as well as industrial coal. Prices in eastern Kentucky are making for slower demand, but operators, while needing business in mine-run, assert they are able to sell full production of lump, and screenings output is light and taken up without much trouble.

In eastern Kentucky operators are asking $6@$6.50 for 2-in. lump and small prepared, while block is quoted at $6.50@$6.75, with Straight Creek operators and some Harlan operators asking $7. Not much coal moving at prices over $6.75. Mine-run is quoted at $3.50@$3.75 for gas while non-gas and screenings are $3@$3.50.

Western Kentucky movement is better in view of lower prices, which are quoted in the Louisville market at $3.50 @$4 for lump, $2@$2.50 for mine run, and $1.25@$1.75 for screenings, buyers to pay brokers' commissions.

Railroad buying is reported as quiet, while general industrial demand is a shade better, although on a hand-to-mouth basis. Retailer buying is much improved

South

TORONTO

There is practically no change in the situation as regards anthracite. Moderate supplies are being received by the dealers, who refuse to receive orders when these are disposed to until further consignments come in. Consumers unable to wait can generally obtain immediate delivery of "brokerage" coal by paying higher prices, which average about $18 per ton. Some Welsh coal remains which is being rapidly disposed of at $15.50 per ton, deliveries being delayed by a rush of orders.

Prices for carload lots of bituminous f.o.b. destination are a little easier, ranging $8.50@$9.25 and Pennsylvania smokeless $8.25. There is no noticeable increase in the demand.

Eastern Inland

Fears of Huge Lake Surplus Have Largely Disappeared

Clean-up at Lower Erie Ports Promises to Be Unusually Good—Domestic Prices Easier Than Elsewhere—Consumers Await Price Fall.

Fears of a week ago that the Lake season would suddenly close and leave a huge tonnage to be thrown back on the local market have largely disappeared. In the week ended Dec. 11 there was dumped 288,869 tons of cargo and bunker coal in lower Lake Erie ports and it is now expected that the clean-up will be unusually good.

Domestic prices are easier in this section than in any other part of the country, warm weather and a plentiful supply softening prices on such coals as Hocking, No. 8, Kanawha and eastern Kentucky.

Consumers are patiently awaiting the market drop and steam prices are losing strength every week.

BUFFALO

Trade is very quiet. Supply is running ahead of demand and prices, of course, are weakening. Shippers try hard to hold up prices and are succeeding fairly well so far, but they are apprehensive of the full force of the lake closing.

Better car supply is responsible for more plentiful coal, but it is by no means good; if it were prices would touch bottom. Predictions of considerably lower prices are made by shippers, but that may not happen right away. Then if the railroads should go to stocking up that alone would add stiffness to the market.

Consumers say their stocks are increasing. They are now able to mix in coal at present prices with some that they bought awhile ago at higher prices. Consumption keeps up and may be increasing.

Quotations are $4.75 for Youghiogheny gas lump, $3.75@$4.25 for Pittsburgh and No. 8 steam lump, $3.25@$3.50 for all mine-run and $3 for slack, adding $2.09 to Allegheny Valley and $2.24 to other coals to cover freight to Buffalo.

PITTSBURGH

The market continues to soften, except on domestic lump, which is strong in price and shows unsatisfied demand. Car supply shows no great change.

The chief movement is on contract. Little coal is moving through the open market in odd lots. It is thought that many consumers are stocking a small part of their contract receipts.

Regular Pittsburgh district steam coal remains quotable at $2.50@$2.75. Connellsville steam coal, some Sewickley seam and some regular Pittsburgh seam is offered freely down to $2.25 and there has been some curtailment of production on account of not finding takers. Odd lots of good grade Youghiogheny gas coal can be had for $3 and good sized lots for regular shipment over a short period fall short of $3.50. Byproduct coal shows little activity, but could probably be picked up at $3@$3.25. Some contracts for particularly good grades have been adjusted to $3.75 for December shipments. Domestic 1¼-in. lump is bringing $5@$5.50 in most quarters. The Pittsburgh Coal Co. continues to bill at $4.50.

COLUMBUS

There is a slight weakness in domestic sizes, caused principally by the continued warm weather. Retail stocks are generally good, but dealers are loath to increase them under present conditions. Retail prices are steady at former levels with Hocking and Pomeroy lump moving fairly well.

Steam trade is quiet. Steam users have accumulated stocks for 15 to 45 days. Consumers apparently are waiting for lower prices, regardless of the possibility of a strike April 1. Utilities are buying well and railroads are taking about the usual amount. During the week ending Dec. 9 there was an exceptional shortage of cars in the eastern Ohio field.

Prices appear to be giving ground, although domestic sizes are holding up best. Screenings are hard to move in some instances and this aids in maintaining lump prices, as operators are sacrificing slack in many instances.

NORTHERN PANHANDLE

Production is about on a par with that of other parts of northern West Virginia. Mines are unable to work anything like full time owing to the difficulty in securing an adequate car supply, though there is a better supply available since the general movement to the Lakes ceased. Demand for steam has slackened somewhat with railroads getting more coal than any other class of customers. Domestic buying is more active than for any other kind of fuel, though extremely irregular. Lump and egg bring $4.25@$4.75, with mine-run priced at $3@$3.50.

EASTERN OHIO

Output for the short week was 263,000 tons, or approximately 50 per cent of capacity, a decrease from the preceding week of 75,000 tons. It is conservatively estimated that car shortage caused a loss of at least 200,000 tons in output. Railroads are taking between 40 and 45 per cent of the output of eastern Ohio mines.

Cumulative figures indicate that output of this field for the calendar year up to Dec. 2 was 10,007,500 tons, as against a potential capacity of 28,974,000 tons.

Operators and jobbers state that steam demand is less active than in some time. In contrast to the slump in steam demand, inquiries from retail dealers are quite active, as domestic consumers have been able to procure coal only in a small way. However, smokeless fuels from West Virginia and eastern Kentucky are coming through more freely and likewise more Ohio domestic lump is now available than formerly.

Spot prices on steam sizes, which have receded from 50 to 75c. per ton during the past few weeks, are about the same as those quoted last week, namely: Eastern Ohio No. 8 slack, $2.75@$3; nut and slack, $3@$3.15; mine-run, $3@$3.25; ¾, 1 and 1¼-in. lump, $3.75@$4; 2, 4 and 6-in. lump, $4.25@$4.50. Ohio No. 6 or Middle District f.o.b. mine prices as well as coal from West Virginia Panhandle district are quoted at about the same figures.

During the week ended Dec. 2 Cleveland industries and retail yards had the largest receipts on record. A total of 2,495 cars was received, 1,748 of which were consigned to industries and 747 cars to retail yards.

In the Lake trade it is now expected that a good clean-up will be made before navigation actually closes and little coal will be left over at the lower lake docks. Lake shipments up to Dec. 4 were 17,171,965 tons, as compared with 22,385,495 tons during the same period of 1921.

CLEVELAND

Industrials continue to delay buying for future needs, filling only spot requirements. Soft-coal prices generally are 25@50c. lower than a week ago. Buyers in this territory believe that the bottom has not been reached, but producers in northern and eastern Ohio look for an upturn in prices soon.

Retailers assert that delivery cost to consumers is increasing steadily because of piecemeal buying by most domestic users.

Some grades are not difficult to obtain, and since the virtual close of Great Lakes shipping, releasing more than 1,000,000 tons of coal weekly to other channels, Pocahontas is coming into this market in much larger quantities. West Virginia and Kentucky coals have shown a price softening here in the last few days.

DETROIT

Offerings of bituminous coal seem to arouse little interest among buyers for Detroit steam plants or the retail dealers. The waiting policy, long characteristic of the market, is still popular. Wholesalers and jobbers report orders small and irregular. Buyers for the steam plants are ordering only current requirements for a few days' operation. Even with the dragging demand, there is virtually no free coal.

A slight improvement in supply of smokeless is reported by some of the jobbers, though the quantity is still far short of normal.

Lack of active interest among steam buyers and retail dealers apparently is based on an expectation that prices will be lower when the Lakes close. Considerable coal is still being loaded for the Lake trade.

Most of Detroit's supply is coming from Ohio. Hocking lump is quoted at the mines at $5.50 per net ton; egg, $5; mine-run, $3.50; nut, pea and slack, $2.75. Pittsburgh No. 8 three-quarter lump is $4@$4.25; mine-run, $3.50; slack, $2.80@$2.85. West Virginia and Kentucky lump and egg is $6; mine-run, $3.50; slack, $3. Smokeless, lump and egg is offered at about $8 with mine-run $4.50.

Northwest

Soft Coal Continues Plentiful and Lower

Volume on Hand Leads Docks to Cut Here and There—Anthracite About Gone and Little More Expected—Rail Bituminous Penetrates Deeper and Deeper.

Further weakness in the price of dock bituminous was evident throughout the Northwest during the past week, especially before a wave of raw cold blew down out of the North about the middle of the week. All shippers have so much on hand and are so pestered by rail coal from the states at the south that they are unloading as swiftly as they can, with little thought for the future except that they are not making future contracts at anything less than circular.

Hard coal is practically exhausted and little more is expected, for the extended navigation season ends Dec. 15. Everybody is prophesying higher prices, but these have not yet made themselves deeply felt. It is to be observed that the battle for markets between docks and bituminous rail shippers is growing steadily stiffer and that rail coal is reaching points a good deal farther north than is customary in normal seasons.

MILWAUKEE

Real wintry weather throughout the Northwest has put life into the coal market, both wholesale and retail. The general public has been strangely indifferent to the abnormal fuel conditions, but the sharp downward turn in the temperature has awakened some country communities. At Green Bay, the State Fuel Commission has been called to investigate a charge that coal-dock operators are discriminating in favor of local residents.

Everything indicates higher prices for anthracite in the near future. A uniform scale has been maintained for years, but now many dealers charge $16.70 per ton for chestnut, carried in while others charge $17.82; egg ranges from $16.50 to $17.25; pea, $14.75, $14.95, $15.45 and $15.93, and buckwheat, $12.25. Soft coal is holding steady. Illinois and Indiana coal is being substituted by many consumers for the higher-priced Eastern product.

Coal is still coming by lake, but not with the expected final rush. Dock men seem to have soft coal enough. One cargo of 10,000 tons of soft coal, which arrived in the harbor a day or two ago, was sent to Indiana Harbor, Ind. The soft coal received has not been up to the usual standard, it is said, and mine prices are high. Anthracite is still coming, however, and late arrivals will consist of hard coal. December receipts thus far aggregate 23,050 tons of anthracite and 15,642 tons of soft coal. This makes the season's receipts thus far 293,303 tons of the former and 2,293,307 tons of the latter, against last year's record of 988,767 and 2,574,374 tons respectively.

MINNEAPOLIS

At last some real cold weather has struck the Northwest, and the surplus steam coal which has been awaiting a buyer immediately took a better standing. All-rail coals from Illinois, Indiana and western Kentucky have been sold in this market at various mine prices, ranging from $1@$2.50 for Kentucky coal up to $4@$5 for Illinois coals. Practically every grade had been selling off from the supposed price until the cold wave braced the market.

The soft-coal market is so completely a weather proposition that producers who send quantities of coal to this market would do well to study the weather predictions before shipping. In many cases demurrage charges run high. One car is rumored to have had a total of $700 against it. The tendency to use this district as a surplus market is making it a less stable one.

Hard coal is certain to be very short with the close of navigation Dec. 15. Something over 400,000 tons of hard coal had reached the docks up to Dec. 4 with little more reported en route. This is some 300,000 tons short of the amount pledged, and will doubtless be reduced somewhat in the few days before the close.

DULUTH

Official figures show that 204,221 tons of anthracite and 1,453,406 tons of bituminous were received at Duluth-Superior harbor during November. This brings the grand total received this year to 436,845 tons of hard coal, 21,875 tons of hard coal screenings and 4,952,594 tons of soft coal. Last year there had been received to Nov. 30, 1,813,336 tons of hard and 8,294,541 tons of soft. Last year, however, the docks were empty when the season started and this year a considerable supply was on hand. By comparing figures it readily can be seen that the Northwest is long on bituminous and short on anthracite.

Receipts are falling off. This week only 36 cargoes arrived, but of these, 8 were anthracite. There are 16 cargoes reported on the way of which 6 are hard coal. The weather is bad, with heavy snow here and it does not seem possible that much more coal will be shipped though the docks have supplies of hard coal to last but 20 days. Most docks here are holding their anthracite for the local trade.

Prices on hard coal remain firm but bituminous shows some weakness, because of the lessening of the market area through orders of the Fuel Administrator. Lump sells for $9.50 still but run of pile is fluctuating between $8 and $8.75, with screenings between $6 and $7. It is worthy of note that docks are not taking contracts for future delivery at less than list.

New England

Market Shows Betterment; Prices Stiffen at Roads

Buying Slightly Improved — Western Demand Attracts Larger Share of Cars—Only Small Tonnages Available for Coastwise Shipment.

Improvement in this territory is by no means conspicuous. A few of the textile mills have bought limited amounts for delivery through the winter, but the aggregate tonnage is not enough materially to affect the market.

Car supply on the Southern roads is still light, and while there is no pressing spot demand, prices have again stiffened somewhat at the piers. Western demand for prepared coal is strong enough to attract the larger share of cars, and in consequence there are only small tonnages available for coastwise shipment. At the same time contract requirements are being met with little or no delay.

For inland delivery $9.25 has been paid per gross ton on cars Boston, a price that compares with $7.75 f.o.b. vessel at Norfolk or Newport News, but as an average quotation this has been shaded within a few days. On-car prices in excess of $9 open a little wider the gate for deliveries all-rail from central Pennsylvania.

The Cambria and more favorably known Clearfield grades maintain a reasonably steady position with respect to price and shipment. Most operators with good connections are able with reduced car supply to keep orders ahead for two to three week period, and while prices show no signs of hardening for the present the mines are able to operate in most cases without reducing their asking price.

Receipts all-rail have diminished the past fortnight, but this is probably due more to reduced shipments of locomotive fuel than to any marked decrease either in buying on the part of industries or to any slowing up of shipments on contract.

There continues fairly constant inquiry for prepared bituminous to take the place of anthracite. In the smaller cities, and in some towns, the great shortage of anthracite has at last induced householders to take small quantities of such bituminous as can be had. A few operators in the Broad Top district have been able to do a flourishing business on screened egg and chestnut sizes at prices far more remunerative than if they were restricted to their normal steam coal trade.

Cincinnati Gateway

Disarrangement of Traffic Nears the Scandal Stage

Situation Upset on Three Roads from South—Collusion to Hold Back Output Inferred—Business Picks Up—Tone More Stable.

Traffic conditions on the three coal carriers using the Cincinnati gateway from the South are fast reaching a point that causes eyebrows to raise and scandal to pop. The Norfolk & Western seems to be in the worst plight, the Chesapeake & Ohio is a little better off, but on the Louisville & Nashville things have come to such a pass that various of the operators' associations have had meetings with those who direct its affairs and they have placed the burden at the door of the shopmen's strike. By inference also it would seem that there is collusion somewhere to hold back production through the channels of transportation so that in the event of trouble April 1 these great producing fields will not have their share of coal above ground.

Business picked up a bit last week. The tone of the market was more stable. Moderate buying by steel plants and byproduct users helped some and the colder weather also deserves a share of credit.

LOW-VOLATILE FIELDS

New River and the Gulf

As a great many mines are not working more than a day a week, the field as a whole cannot even handle contract orders promptly, leaving little or no free coal to be disposed of in the open market. Not a large proportion of the output is being shipped to Western markets, since equipment is not to be had. Furthermore demand has improved at Tidewater, where prices are attracting larger shipments, the prevailing price being about $5.25 a ton. Prepared grades in the Eastern and Southern markets are bringing from $7 to $7.50.

There has been a slight improvement in transportation conditions affecting the Winding Gulf region. Virtually all the tonnage is going to Tidewater, since the western outlet is restricted. The price, too, is on a higher level, with mine-run bringing over $5 a ton.

Pocahontas and Tug River

Distribution of empties is not now equal to more than 40 per cent of allotment, so that few mines are operating more than two or three days a week. There is an increase in the movement to Tidewater, where prices are on a somewhat higher level, the ruling price at the piers on a spot basis being $5@$5.25.

In view of the fact that so large a proportion of the tonnage originating in Tug River territory is marketed in the West the difficulty in obtaining equipment to transport Tug River coal to western markets is being seriously felt. Prepared grades, being scarce, are bringing high prices, with $8.50 the maximum, in some parts of the West.

HIGH VOLATILE FIELDS

Kanawha

Car supply has improved of about 5 per cent as compared with previous weeks. Mines are able to work two days at best and many only one day a week. Therefore a waning demand has exerted less effect than might otherwise have been the case, for output barely suffices for regular customers. Tonnage to be had in the open market is not large nor is it bringing as high a price as it did. Steam mine-run ranges $3 @$3.75. Restricted use of the larger cars of the C. & O. is tending to throw more Kanawha coal to Eastern markets.

Logan and Thacker

Because of the failure of the C. & O. to furnish anything like an adequate car supply, this district is not loading more than 160,000 tons a week. The falling market has not had any adverse affect on the region as a whole for the simple reason that there is little or no surplus coal to be had in the Logan region. What little coal there is moving on a spot basis is of course bringing lower prices, especially in so far as steam mine-run is concerned.

Conditions in the Kenova-Thacker field are much the same as in other fields served by the N. & W., with mines limited to two and three days a week because of poor car service. Western equipment is used almost entirely by the Thacker field since nearly all the coal originating in this territory is marketed in the West. Production is scarcely more than equal to the needs of regular customers, so that a declining market and softening prices has not affected production so far.

Northeast Kentucky

With production not over 100,000 tons per week, or about 27 per cent of potential capacity, there is little coal to be had over and above that needed to take care of standing orders, so that prices obtaining in this territory are somewhat higher than those in the general market. Lump is bringing $6 a ton and mine-run $3.50@$4.

CINCINNATI

The smokeless market has been pretty well riven to "sixes and sevens" through the traffic difficulties. With tide prices $1.50 a ton below those of this and the market inland the movement west over the N. & W. since the middle of November has been a minimum for Pocahontas coal. That from New River has been of no great tonnage and what has fallen into the hands of the jobbers has been held at prohibitive prices.

After a drop of considerable proportions the steam market took a brace under better buying and both slack and mine-run made a slight recovery. Domestic sizes are holding their own, though there is a disposition to grant concessions in price.

With 60,000 tons of river coal placed in the local harbor the retail trade served by companies handling it again became a potent factor in this angle of the business. One firm is selling its splint lump at $8.75, while all-rail brings up to $10. Buying from brokers has forced the price on Pocahontas lump up to $11 with mine-run bringing $9.75@$10; bituminous slack is quoted at $7.50.

Coke

CONNELLSVILLE

The coke market has gone contrary to expectations, as prices have been softening and production is being curtailed at some points from lack of demand.

The spot furnace coke market, quoted a week ago at $7.25@$7.50, is down to $6.50@$7, while shipment over the balance of the year can be done at $6.75 @$7, against $8, formerly demanded. Foundry coke is soft at the former range of $7.50@$8.

The *Courier* reports production in the Connellsville and lower Connellsville region in the week ended Dec. 2 at 121,000 tons by the furnace ovens, a decrease of 7,350 tons, and 77,770 tons by the merchant ovens, an increase of 20 tons, making a total of 193,770 tons, a decrease of 7,330 tons. These are the first decreases since the strike started, except early in July.

UNIONTOWN

With several thousand former miners still on strike operators have been forced to cut production with new labor, as they see no market for their product. The closing of the Great Lakes trade left a big gap in the destination of Connellsville coal and operators have not been able to make arrangements for the delivery elsewhere.

Consumers are buying most sparingly. Prices for steam coal continue at the $2.25@$2.50 level with byproduct at $3@$3.50. The cost of output is approaching too near the market to be comfortable.

Practically the same situation prevails as regards coke. A limit of $7 apparently had been placed upon furnace coke by a number of operators and they now have their choice of revising their price views or suspending. The market has definitely dropped to $6.25 and $6.75 and even at that figure furnaces do not care to buy heavily.

BUFFALO

The demand for coke, especially for domestic purposes, is good. The local ovens do not get any surplus for domestic use, so that it all has to come from some other source. The use of coke in place of anthracite is increasing and that keeps prices up. Jobbers quote 72-hour foundry coke at $7.50@$8, furnace at $6.25 and stock at $6, with domestic sizes at $9.50@$10, adding $3.28 for freight.

News Items From Field and Trade

ALABAMA

The twenty-five new Koppers ovens of the Alabama By-Products Corporation, Birmingham, on which construction was begun in July last, will be placed in operation this week. This will add 50 per cent to the capacity of the plant, making a total of seventy-five ovens in operation.

James E. Strong, one of the oldest and ablest coal-mine executives in the Birmingham district, who for the last two years has been general superintendent of mines for the **Alabama Company**, has been elected to a vice-presidency in that corporation and will have jurisdiction over the maintenance and operation of all physical properties.

ALASKA

A fire which started Nov. 20 **in the Evans Jones coal mine** on a spur of the Alaska R.R. and is still burning has brought Anchorage face to face with a fuel famine. Every available miner and three caterpillars have been impressed in an effort to open another mine and get coal from it to the railroad.

CALIFORNIA

Appointment of the **McCormick Steamship Co.** of Los Angeles, as Pacific Coast representatives for the **Castner, Curran & Bullitt Co.** of New York, is bringing another big East coast line into the intercoastal trade. Eight steam colliers,, ranging in size from 4,000 to 12,500 tons deadweight, are owned by the company, and these ships, it is said, will be pressed into the new service. Under the scheme of operation the vessels will carry coal from North Atlantic ports to the Pacific Coast, returning to the Atlantic seaboard with Pacific Coast lumber. The steamer Deepwater, 12,500 tons deadweight, is expected to bring out the first cargo. It is expected that coal shipments from the East coast will be consigned to Los Angeles from time to time.

COLORADO

A cave-in at the Fox mine near Gorham, Dec. 1, buried Kenneth Baldwin, a miner, under an immense weight of rock and dirt for 9 hours and 42 minutes, but, doubled up in a sitting posture, the man lived through it and was dug out alive and with no injuries except a nervous shock. His salvation was due to the falling of timbers in such a position that their ends lit on a mine car and, although this accidental roof was crushed down almost flat with the man under it, the space beneath was enough. When rescuers, digging through the 30 ft. of overburden at the point of the cave-in, had worked frantically for six hours they heard Baldwin's voice, and were astonished to know that he was alive. After more than three hours more of toil they uncovered the prisoner, removed a heavy rock from one of his legs and took him to safety. This is the third cave-in at the Fox mine within a short time.

Gross receipts of the Colorado Fuel & Iron Co. for the three months ending with September were $7,266,964, an increase of $1,697,817 over those for the corresponding period in 1921. Operating expenses were $946,162 larger than those for the 1921 quarter, standing at $6,376,401. Thus the net earnings were $890,563, while in the 1921 quarter they were $138,908. Other income brought earnings for the third quarter up to $963,955, but after interest, taxes and depreciation there was a deficit of $131,463, whereas in the three months ending Sept. 30, 1921, there was a deficit of $810,868. The financial statement for the nine months ending with September last is not so encouraging. Gross receipts amounted to $22,492,865, whereas for the corresponding period in 1921 they were $23,587,982. Operating expenses were $19,993,964, while last year they were $21,669,486, and total net income $2,706,288, as against $2,221,401, while the deficit for the first nine months of this year was $581,162, or $2,068 larger than the deficit for the same period last year.

The Royal Fuel Co. whose mine is located at Aguilar in southern Colorado, under the supervision of Samuel Tescher, general superintendent, **is sinking a new two compartment airshaft**, 10 ft. x 20 ft. and 450 ft. deep in the clear. One compartment will be a downcast, while the other will be an upcast equipped with a suction fan. The mine will be ventilated by two separate ventilating units, which can be operated independently. The cost of the improvements is estimated at $50,000.

ILLINOIS

The **claim of the city of St. Louis against the St. Clair Coal & Mining Co.** arising out of the short weight frauds at the city water works from 1918 to 1921 for $9,000 has been settled for $7,000. J. M. Brickler, secretary of the coal firm, who turned state's evidence took $15,000 for his interest in the firm in the settlement. This action has no effect upon the prison sentences of two years each against M. B. Rosenheim, city weigher, and Edwin F. Kleine, now out on bond, and F. W. Kleine, yet to be tried.

Five hundred children of coal miners at West Frankfort who had no public schools for sixty days resumed school duties Dec. 3. Local differences in that coal-mining community defeated the bond issue for $64,000 for teachers' salaries.

Earth tremors lasting several minutes were felt at 9:30 p.m., Nov. 27, over the greater part of the southern Illinois coal fields. At places chimneys were toppled over, but no damage reports from mines are in.

Plans are under way to organize a company to construct **a 16-in. water main from the Mississippi River near Grand Tower to Christopher in Franklin County**, by the way of Murphysboro, Carbondale and Herrin. This would go through the center of the Jackson, Williamson and Franklin County coal fields and is approved of by the leading business and coal men in southern Illinois. This might eliminate for all time the scarcity of the water in the coal belt. It is expected that an expenditure of $10,000,000 would be necessary for equipment to pump 7,500,000 gallons of water daily. The railroads in southern Illinois also might get water from this main, which would lie in a private right of way.

In **a "safety first" week** just ended at No. 2 mine of **Donk Bros. Coal & Coke Co.** at Maryville a record of **no accidents** was established for the first time in the 20 years of operation for that mine. Heretofore accidents per week were from 10 to 15. This mine employs 550 men. **William Vanline** is manager and **Clarence A. Naern**, safety engineer. A similar campaign is scheduled for the Edwardsville mine.

The Chicago Trust Co., through J. W. Marshall, manager of its bond department, denies that it is in any way interested in any bond issue of **The Sunnyside Mining Co.**, of Herrin, and that no trust deed for a bond issue by that mining company has been filed with it.

Silas Shafer, president of the Assumption Coal & Mining Co., of Assumption, is recovering satisfactorily from the effects of an automobile wreck in which he was caught. Mr. Shafer's machine turned over, breaking his left arm. Having suffered five arm breakages during his life. Mr. Shafer takes such things as matters of course.

Coal was struck recently in the new mine located near Cantrall, Sangamon County, owned by Sidney Grant, Frank Boyer and Henry Struse. The vein which was found to be 6 ft. thick was struck at a depth of 220 feet. Sinking had been going on since early last spring. The mine is served by the Chicago & Northwestern railroad and will be equipped with modern machinery and appliances.

E. L. Berger, superintendent of the Bell & Zoller Coal Company, Zeigler, who underwent a serious operation in a Benton hospital recently has recovered and is back at work.

Fifteen thousand acres have been prospected for coal near Haemel. As a result A. W. Crawford, of Carlinville, acting as a representative of St. Louis capitalists, is buying coal leases. About $300,000 has been paid out in cash to the farmers in the last ninety days.

INDIANA

The American Coal Mining Co., at Brazil, Ind., has filed a preliminary certificate of dissolution with the secretary of state.

The car situation in southern Indiana, especially with the mines in the region served by the Southern Railway, **is improving**, according to Harry W. Little, manager of the Southern Indiana Coal Bureau. During a recent week the 16 mines along the road received 53.5 per cent of the cars ordered. A total of 1,631 empties were ordered. Forty-eight cars were furnished by the E. S. & N., 681 by the Southern and 143 by the Big Four railroad. The mines were able to operate about 47.2 per cent of the potential running time. It is believed it is only a question of time until the mines will be receiving 100 per cent of cars ordered.

A trust deed for $150,000, drawn by the **Lenoir Coal Co.** and in favor of the Aetna Trust and Savings company of Indianapolis, has been recorded. The coal company, whose home is in Terre Haute, did not set out any specific use to which the money is to be put. Its lands in Greene County were given as security.

IOWA

The Whitney Coal Co. of Des Moines, has been incorporated with a capital stock of $15,000. The following are the officers: George E. Whitney, president; C. W. Rhoads, vice-president; A. S. Burnette, secretary; and James H. Deemer, treasurer. These men form the board of directors with Fred W. Evans.

KANSAS

The Oklahoma coal field near the Kansas line, which was opened last year, has spread into Kansas and promises to bring a new industry into this part of the state. **The Central Coal & Coke Co.** has been acquiring leases in Labette County near Edna.

Lon Mitchell, a farmer living near Englevale, in this county, dug up dirt on a public road near his place to get at coal that was underneath. A warrant was issued at the instance of C. M. Cooper, county engineer, ending the project and Mitchell will have a trial soon at Girard, Kan.

KENTUCKY

Kentucky production this year should exceed the mark of 31,588,270 tons reported for 1921, in a Geological Survey report released a few days ago. During the early days of the coal strike Kentucky ran practically full, and piled up a big tonnage increase, which will make up, to a considerable degree, for the car shortage. The L. & N. had some months this year which exceeded any previous months in the history of the road. All told, production this year has been very good, in spite of the complaint of operators, and indications are for larger tonnage showing.

The Inland Waterways Co., a $2,000,000 company, formed some months ago, **has started work on combination rail and river terminals** at the east end of Louisville and is having conveyor equipment built for use from a floating dock in unloading cargoes of coal, merchandise, etc. The company is having a number of steel barges built and is towing a good deal of coal from its Kentucky River mine subsidiaries to Louisville when open water permits.

W. D. Beerman, of Nashville, Tenn., **has** joined the sales force at the **Dixie Coal Co.**, Louisville. **Manager Harry H. McBratney**, of the local office, has been spending a few days at the Chicago office of the company.

The Falls Branch Coal Co., Louisville, capital $70,000, has been chartered by **Powhatan Woolridge**, of Pewee Valley, C. F Woolridge, Louisville, and J. P. Woolridge, of Woolridge, Tenn., for the purpose of owning and leasing coal and timber property and mines.

Frank Sneed, of the Harlan Coal Co., recently was elected vice-president of the Pendennis Club, of Louisville, one of the oldest and finest social clubs in the South.

The Madisonville Coal Properties Co., of Madisonville, has been incorporated with a capital of $100,000. The incorporators are J. B. Ramsey, B. C. Mitchell and R. H. Gatton.

MINNESOTA

The shortage of hard coal to the Lake Superior docks is seriously disturbing the coal commission of Minnesota, which has been struggling to induce a rushing forward of additional cargoes, but with limited success.

MISSOURI

Sam Reftt, 79 years old, who has been digging coal for 68 years and who is good for several more years in the mines, believes that his record is the best in Missouri and that it would be hard to equal in any part of the United States. He declares that he can still do as much work as any man and his pay checks bear him out. He was born in Brazil, Ind., but has lived in Bevier 73 years. Reftt declares that he once dug coal for 50c. per ton and mined it on the bench. He has been a member of the United Mine Workers ever since its organization. When he joined, the initiation fee was 25c. He also remembers when the coal companies compelled the miners to buy all of their supplies and provisions from the company store. He never has had an accident in the mine during his long career and is an advocate of plenty of hard work, declaring it does not hurt anybody.

A company formed at Sedalia has **leased the George Penrod farm,** near the Pettis-Johnson county line, where mining for coal will be started at once. The company is made up of Pettis and Johnson County stockholders. The construction of a switch from the main line of the railroad has been completed.

The Missouri-Kansas Coal Co. has been incorporated with $10,000 paid in to operate a coal mine at Worland.

OHIO

A dozen towboats left Dam 26, near Gallipolis, at noon Wednesday, Dec. 6, for Cincinnati, with 60,000 tons of coal for distribution to dealers. Nine other boats left Huntington, W. Va., Tuesday, with 35,000 more tons for Cincinnati, according to J. A. Reilly, manager of the Queen City Coal Co. With these two shipments the market will be supplied for about 10 days, Reilly said, and more shipments will be forthcoming soon. The river, he said, is in excellent condition for navigation.

Bids will be opened Dec. 21 by R. W. Smith, clerk of the Board of County Commissioners of Columbus, for 100 tons of lump or mine-run for the Court House; 2,000 tons of the same kinds of coal for the county infirmary and 500 tons for the Memorial Hall. Coal for the Court House and Memorial Hall must be delivered while that for the County Infirmary is to be placed on the infirmary switch.

Steps are being taken by the newly incorporated **Caledonian Coal Co.,** of Columbus, **to sell its mining property** near Nelsonville. The company was chartered with a capital of $50,000 by James Williamson, George Williamson, E. M. Blower, Charles Wallace and John Williamson. The property consists of 400 acres with a working mine.

It is unlikely that any coal will be purchased by R. V. Johnson, Superintendent of Purchase of Ohio, on bids received Dec. 1 for supplying approximately 125,000 tons of coal to the various state institutions under the Department of Welfare. The bids ran too high, according to Mr. Johnson. Low bids at the mine for Hocking nut, pea and slack were $2.39 and for mine-run $2.99. It is believed that bids will be called for again about the first of the year.

If the estimate submitted to Congress, in the annual report of Major General Lansing H. Beach, Chief of Engineers, U. S. Army, is approved, $7,000,000 will be available in the fiscal year 1924 for the continuance and completion of work upon the locks and dams under construction in the Ohio River at the close of the present fiscal year. The financial summary of the Ohio River lock and dam project contained in the report shows that total appropriations to date amount to $72,196,579,178, of which $65,737,290 has been expended on new work. The amount expended on new work during the fiscal year ending June 30, 1922, was $4,481,101, leaving an unexpended balance of $6,450,289.

A new coal road, which will result in the development of **thousands of acres of coal land lying west and north of Steubenville,** in Jefferson County, will be built by the Cleveland & Pittsburgh division of the Pennsylvania R.R. Permission to construct the tracks across the county highway north of Steubenville has been granted by the County Commissioners and negotiations have been commenced by the company for the purchase of a strip of city property needed for the right of way.

Inasmuch as the order of attachment in the case of **Harvey Sipe against the United Mine Workers of America** has been quashed by the Circuit Court of Harrison County it has now become possible to pay over to the union the proceeds of the check-off collected in Harrison County, W. Va. As long as the order of attachment was in force, coal companies in Harrison County were forbidden to pay any check-off funds to subdistrict officers. The ruling releases between $5,000 and $6,000 in check-off money. Sipe sued the union when it refused to enter into any contract with him for the operation of his mines, because the mines belonged to the Hudson Coal Co., which has refused since the end of the strike to make an agreement with the union.

PENNSYLVANIA

Additional tank trains have been placed in service recently in hauling water from the Susquehanna River at Sunbury, twenty miles distant for use at collieries at Shamokin, where **production of anthracite is being gradually curtailed as a result of the acute water situation.** Several large industries operating their own power plants were forced to shut down a majority of their boilers, continuing only sufficient for heating purposes and are purchasing power transmitted from Hauto, forty miles distant.

A conference of official representatives from all cities, boroughs and townships in the anthracite region at Wilkes-Barre, Dec. 14, has been called by the Wilkes-Barre City Commissioners. The conference is to discuss proposed legislation which would give the anthracite region municipalities a fair share of the tax on anthracite to repair damage to roads and other public property caused by mining operations and for other municipal purposes.

Actual work on the **erection of a mammoth power plant** at Springdale by the **West Penn Power Co.** in addition to the large plant now being operated, will begin within a few weeks, according to A. M. Lynn, president of the company. The financial outlay, according to Mr. Lynn, will exceed $6,000,000, and the new plant will be much larger than the present one. When the present plant at Springdale, one of the most modern and complete power plants in the country, was erected, provisions were made for the enlargement, which will soon be under way and which, when completed, will multiply its capacity several times.

Coal miners of the country are being assessed to liquidate a $1,000,000 loan incurred by the United Mine Workers of America in the last strike, according to assessment notices in the Wilkes-Barre district. Thomas Kennedy, president of District No. 7, U. M. W. A., has sent out the following notice: "During the six months' strike in the anthracite and bituminous regions the organization was compelled to borrow more than $1,000,000. In order to secure the loan of this money every international office of the United Mine Workers of America, including the national board members, who owned real estate or any property, mortgaged his home and property as collateral. This money helped to win the strike and made it possible for the mine workers to enjoy and hold their old conditions and rates of wages, and this money must now be paid back and our obligations liquidated."

A banquet in honor of the members of the **mining department helmet team of the Cambria Steel Co.** was given recently by company officials. Each member of the team was presented with a watch as a tribute to the valor of the men in rescuing fourteen entombed miners at the Reilly mine at Spangler on Nov. 6, when seventy-seven men lost their lives. About fifty men attended the banquet. The watches were presented by L. R. Custer, vice president in charge of operations, to the following members of the crew: Edmund Williams, David Malcolm, William A. Thomas, George Winder, Paul Smolnik, Richard G. Lewis, Owen Robertson, Arthur Schallenberger, Fred Smith and Joseph Martin. Mr. Custer praised the men highly for their efficient service and reviewed the work of the helmet crew in other mine disasters.

C. F. Ingold, vice-president of the Bertha Coal Co., Pittsburgh, has just returned from a western business trip, during which he visited with T. P. Jones, resident manager of the company at Cleveland, and Vaughn J. Jolliff, resident manager of the company at Detroit. Mr. Ingold reports the prevalence of healthy business conditions, and while there is a great shortage of cars, sufficient equipment is available to move all the coal required.

UTAH

The **Columbia** and **Pacific Steel companies,** which recently entered the Utah field, are to **merge their interests.**

The case of the United States vs. the State of Utah and the Pleasant Valley Coal Co., involving the question of the known qualities of a tract of land in Carbon County in 1896, the year in which Utah was admitted to statehood, is to be reopened. The state sold the land to the coal company, but Mark P. Braffett later made application to the federal authority for the land, believing it belonged to the United States. The case is an old one and the question to be decided is: **Was it known that the land contained coal on Jan. 4, 1896, when Utah become a state?** The Secretary of the interior has ruled that the point in question might be determined by geological inference rather than from the actual exposure of a seam of coal.

R. Y. Gibson and **N. M. Madsen** of Madsen Bros. are **opening up a new mine** about one mile south of and above Scofield on Clear Creek branch of the D. and R. G. W. R.R. It is expected that shipments will be made on or soon after Jan. 1.

WASHINGTON

T. E. Doremus, who for the past three and a half years has represented E. I. du Pont de Nemours & Co. as general eastern manager for the Orient, with headquarters at Shanghai, China, has returned to the United States. Mr. Doremus is now located at Seattle, where he is manager for the explosives department of the du Pont company.

The **Pacific Shipping & Fuel Co.,** of Seattle, has increased its capital stock from $75,000 to $100,000.

WEST VIRGINIA

The property, plant and assets of the **Mason Coal & Chemical Co.,** sold to satisfy the claims of creditors, have been acquired by **J. K. Oney,** a Huntington banker in association with others, the purchase price being $95,000. Included in the purchase are between 900 and 1,000 acres of coal land. Others interested with Mr. Oney in this property are S. A. Lewis of Charleston and John D. Smith of Hamlin. After being closed down for nearly a year, it is understood that the mine will be re-opened by the new owners after improvements have been made.

Charleston people have just launched the **Colgate Coal Co.** which will operate in southern West Virginia high-volatile territory, Charleston to be the general headquarters of the company for a time. This enterprise is capitalized at $25,000. Among those interested in it are: A. L. Goff, L. C. Pasley, M. D. Hill, G. Blaine Nicholson, all of Charleston; A. W. Fluegel of Blakeley.

Coal lands in the Indian Hill section of Monongalia County are to be developed by the **Indian Hill Coal Co.** just organized with a capital stock of $50,000. The office of the company is to be at Morgantown. Having an active part in its organization were: Lemuel J. John, Jr., C. B. Jenkins, Ralph M. Bradford, James E. Gaskin and C. H. Humphreys of Morgantown.

Said to be the **first shipment of coal** coming down the Ohio River from mines on the Allegheny River, four barges of coal in tow of the Steamer Transport **passed through Pt. Pleasant,** during the closing days of November destined for the Portsmouth mill of the Wheeling Steel Corporation. The Transport is said to be the largest towboat on the Upper Ohio, having been recently secured from the Water Transport Co. by the steel corporation. This boat will be used regularly to tow coal from the mouth of the Kanawha to the Portsmouth plant.

Suit has been instituted in Monongalia County growing out of a controversy over three cars of coal furnished by the **Blue Flame Coal Co.** to **G. W. Otto,** of Fairmont, who in turn had a contract with the **Bertha Coal Co.** The suit in this case brought by the Blue Flame Company is against the Bertha company. Otto, according to an agreement signed in May, 1922, was to furnish the Bertha company 100,000 tons of coal within a period of 90 days, the price being $2.75. The Bertha company in its answer alleges that there was no contract between it and the Blue Flame company and that the three cars purchased by Otto from the Blue Flame company was not purchased at the instance of the Bertha company.

There was a **toll of 41 deaths** in connection with the production of coal in West Virginia **during the month of October,** 21 of the fatalities being due to fall of roof and coal. There were seven deaths as the result of mine car accidents. Mine motor accidents took a toll of two and three men were killed by explosives. Thirteen of the fatalities were in McDowell County but there were six each in Logan and Raleigh counties.

John E. Norvell, of Huntington, W. Va., president of the National Association of Credit Men, told the **Norfolk-Tidewater Association** in an address that wages paid coal miners were far too high and, with high freight, constituted a condition which would have to be overcome if the Hampton Roads coal piers hope to return to normal activity.

CANADA

The Bureau of Statistics at Calgary, Alberta, states that for the last two years the Province of **Alberta has held the premier position among the coal-producing provinces** of Canada, with Nova Scotia, the former leader, a close second, and British Columbia third, with Saskatchewan and New Brunswick following in order.

Fire, supposed to have been caused by defective wiring, completely destroyed the power and boiler houses and the pumping station at the **International Coal & Coke Co.'s mine**, at Coleman, near Lethbridge, Alta., in the early morning Nov. 30. The damage is estimated at $300,000, and it will be at least a month before it will be possible to repair the damage sufficiently to allow the mine to be operated. The night engineer, T. Machin, who rendered considerable assistance in fighting the fire, after it was evident that the building could not be saved, went into the power house to get some papers, and has not been seen since.

Fire of unknown origin destroyed the boiler house, washrooms and other buildings at the Banner mine in the Cardiff coal fields, twenty miles north of Edmonton, Alta., where a strike of coal miners is in progress. A loading tipple was saved by heroic efforts of firemen. The financial loss could not be estimated. All the mines in the Cardiff district are closed. The Great Northern Company's plant in the district bears a notice reading: "Mine closed indefinitely." It is believed a deadlock has been reached between the operators and the miners.

Coal shipments by the British Empire Steel Corporation, Sydney, N. S., for the St. Lawrence market have been **closed for the season** with the unloading of the last cargo of 10,000 tons at Levis. The total shipments for the season amount to 1,660,000 tons. The largest total for any previous year was in 1913, when 2,500,000 tons were shipped up the river from Cape Breton.

On Nov. 27, Wm. Shaw, government mine inspector, E. I. Roberts, manager of the Yellowhead coal mine, and Hiram Davis, an employee, were **suffocated by gas** in the Yellowhead mine, Coalspur, Alta. The workings were smouldering and the men had gone into the mine to ascertain if it was safe for the miners to enter and fight the fire.

WASHINGTON, D. C.

The Director of the Budget has approved proposed **expenditures of $3,358,790** to be used during the next fiscal year **by the U. S. Geological Survey and the Bureau of Mines.** The greater part of that sum will be expended on work of direct concern to the mining industry. The budget carries $1,576,090 for the Geological Survey and $1,782,700 for the Bureau of Mines. In each case this represents an increase over the amounts appropriated for the current fiscal year.

The principal items proposed for the Geological Survey are as follows: For the preparation of reports on the mineral resources of the United States, $124,250; for geologic surveys, $351,900, an increase of $51,900; for the clerical staff, supplies, traveling expenses and printing, $324,500; for chemical and physical researches relating to the geology of the United States, $40,000; for preparation of illustrations, $18,280; for work on the mineral resources of Alaska, $75,000; for engraving and printing geologic maps, $110,000; for gaging streams and determining the water supply of the United States, $179 500; for the classification of lands, $300,000, an increase of $75,000.

The principal items comprising the appropriations of the Bureau of Mines follow: For mining experiment stations, $175,000, an increase of $5,000; for mineral-mining investigations, $125,000; for investigations of mineral fuels, $146,000, an increase of $10,000; for operating mine-rescue cars, $211,000; for investigations as to the causes of mine accidents, $393,000, an increase of $15,000; for clerical help and **general expenses**, $78,700; for inquiries and investigations, and dissemination of information concerning the mining, preparation, treatment and utilization of petroleum and natural gas, including economic conditions affecting the industry, with a view to economic development and the conserving of resources through the prevention of waste, for enforcement of the Leasing Act, for enforcement of laws relating to leases on Indian lands and naval petroleum reserves, $485,000; for supervision of coal and mineral leases, $45,000; for mining investigations in Alaska, $35,000; for the purchase of 78 acres of land at Bruceton, Pa., now occupied by and adjacent to the buildings and equipment of the explosives testing station and experimental mine of the Bureau of Mines, together with 10 acres of unmined coal, $33,000.

The budget includes substantial additions to cover the leasing work being done by the Bureau of Mines. This includes the expense of furnishing technical supervision over leasing on Indian lands. This responsibility has rested with the Bureau since Secretary Fisher's day, but it was necessary to take from other appropriations for this work. The need of making this inspection more systematic has become apparent and a special fund is being asked. An increase has been allowed so as to permit the purchase and operation of equipment for investigating liquid oxygen. Another increase provides for the study of a classification of coals by use. In addition, it is expected that other substantial sums will be available to the Bureau on transfer from the Navy for work on naval petroleum reserves and from both the Army and Navy for work on helium and for testing explosives.

The appropriations asked for but not allowed by the Director of the Budget include that providing for a field testing station for oil shale work and for its operation for the first year. The Director of the Budget also reduced the amount requested for the bureau's leasing work and it probably will be necessary to ask for a deficiency appropriation, especially for the coal leasing work. To meet that emergency the Secretary of the Interior has authorized the temporary transfer to the Bureau of Mines of several of the field agents of the Land Office.

No appropriation was asked for new mine-rescue cars. The cars appropriated for last year are nearing completion and will be available for service after the first of the year.

The Government Fuel Yard is now operating on a basis which will permit of a reduction in the revolving fund from which coal purchases are made. This reduction was requested by the bureau.

Kingman Brewster has been made chairman of the committee on appeals and review of the **Bureau of Internal Revenue.** Mr. Brewster has been serving as special attorney for the Bureau in the office of the solicitor.

Traffic News

Complaint has been filed by the **Copen Gas Coal Mines** against the B. & O. with the public service commission of West Virginia as to station facilities in Braxton County, the complaint being that such facilities are inadequate and do not permit of the prompt handling of the product of the company.

As an emergency exists on the line of the B. & O. because of the threatened destruction by fire of a large stock pile of bituminous coal, the I. C. C. has ordered that effective Nov. 29, the B. & O. furnish open-top cars to the **Elkhorn Piney Coal Manufacturing Co., at Weeksbury, Ky., for the loading of coal now in stockpile,** at the rate of 30 cars per day for each consecutive working day until a total of 250 cars are assigned. The cars so placed shall be counted against the distributive share allotted to the mine.

Canadian roads having withdrawn their requirement that **freight charges to the border on coal and coke from United States** points to Canadian destinations must be prepaid. Eastern carriers are arranging to accept these shipments forwarded on and after Dec. 10, 1922, with charges to collect.

The Missouri-Pacific R.R. on an order from C. E. Spens and the I. C. C. is delivering to operators in the Spadra, Ark., hard coal field 40 coal cars daily for ten days to relieve the demand for this coal in western Missouri and Iowa, eastern Kansas and Nebraska, occasioned by the shortage of Pennsylvania hard coal.

An effort to increase the first zone coal freight rate was resisted by northern West Virginia coal shippers when that question came up for a hearing before representatives of the Interstate Commerce Commission on Dec. 4 in connection with the case of the Pittsburgh Coal Co. against the P. C. C. & St. L. The present state rate is 12c. per ton lower than the present interstate rate and the proposal is to increase the rate from 64c. to 84c. a ton. West Virginia shippers claim that Pennsylvania shippers are behind the movement to have the zone rate increase and have retained counsel to represent them at the hearings which have been in progress.

Beginning Dec. 1, consumers of coal in Terre Haute and other cities in the Wabash valley were affected favorably by a recent ruling of the Public Service Commission carrying a **10 per cent reduction in the Indiana short-haul coal rates** for distances of thirty miles and less. The reduction was ordered as a result of a complaint filed by the Terre Haute Chamber of Commerce, which was heard by the Public Service Commission Aug. 31. The local chamber was represented by W. M. Myers, general manager of the Highland Iron & Steel Co., and also chairman of the executive traffic committee; Samuel Royse, W. S. Blauvelt, president of the Indiana Coke & Gas Co., and R. I. Pierce, traffic manager of the local chamber. If the rates had not been contested the cheapest rate on coal into Terre Haute would have been 89c. a ton instead of a minimum of 50c. a ton. As approximately 1,000,000 tons of coal are consumed by Terre Haute industries yearly, a savings of more than $300,000 a year will result.

Association Activities

Northern West Virginia Coal Operators Association

A conference between directors of the Northern West Virginia Coal Operators Association and executives of the Baltimore & Ohio Railway was held at Fairmont late in November, officials of the railroad making a special trip to Fairmont to go over the transportation situation with the operators. A. Lisle White, of Clarksburg, president of the association, acted as chairman of the meeting. C. H. Jenkins, of Fairmont, former president of the association, acted as spokesman for the operators and presented their grievances which had been incorporated in a statement prepared by Secretary George S. Brackett. Former Governor J. J. Cornwell, now general counsel of the road, and C. W. Galloway, vice-president of the road, reviewed at length the conditions responsible for a shortage of equipment and held out hopes of marked improvement.

Obituary

John Dolan of the United States Fuel Company died recently in a Gary, Ind., hospital where he had been confined for over three years. Dolan was assisting in paying off a large payroll at the Middle Fork mine near Benton, Ill., June 27, 1919, when five bandits drove up and shot him without warning, one bullet taking effect in his spine. He was rushed by a special train to a St. Louis, Mo., hospital but never regained health again. One of the bandits was instantly killed in the skirmish while running to his car while the other four were duly sentenced to the penetentiary. Dolan was a man highly respected by all who knew him.

John Martin Rowe, who has been connected with the operations of the Yolande Coal & Coke Co., Yolande, Ala., for a number of years, died Nov. 26 as the result of a stroke of apoplexy. He was well known in mining circles. Mr. Rowe is survived by one daughter and three sons, one of whom is Edgar J. Rowe, of the coal sales agency of Adams, Rowe & Norman, Inc.

George Crooks Silcott, aged 58, president of the **G. C. Silcott Coal Co.,** with offices in the Brunson Building, Columbus, died rather suddenly at his country home at Worthington, a suburb of Columbus. He had been a resident of Columbus for seven years, coming from Nelsonville, where he was interested in the operating end of the coal business for twenty years. He was born in Ravenswood, W. Va. He leaves a widow and a son, Gordon R. Silcott.

Coming Meetings

American Engineering Council will hold its annual meeting Jan. 11 and 12 at the headquarters of the Federated American Engineering Societies, 24 Jackson Place, Washington, D. C.

Northern West Virginia Coal Operators' Association will meet Feb. 13 at Fairmont, W. Va. Secretary, G. S. Brackett, Fairmont, W. Va.